
University of Pretoria Yearbook 2020

Faculty of Engineering, Built Environment and Information Technology

Welcome to the Faculty of Engineering, Built Environment and Information Technology

The Faculty is a leading source of locally relevant and internationally competitive programmes in Engineering, the Built Environment and Information Technology, at both undergraduate and graduate levels. It attracts high-quality students and staff, and offers extended programmes to facilitate inclusiveness. It is well resourced in terms of teaching and research facilities, and houses several research institutes. The Faculty maintains close links with industry that supports both the teaching and research programmes. The multidisciplinary nature of the Faculty facilitates interaction across disciplines in both teaching and research activities.

Faculty regulations and information

The rules for the degrees published in this Yearbook are subject to change and may be amended after the publication of this information.

The General Regulations (referred to as G.1-G.56) and General Rules apply to all faculties of the University of Pretoria. It is expected of all students to familiarise themselves well with these regulations and rules as well as all faculty-specific and programme-specific regulations and information as stipulated in the online yearbook. Ignorance concerning these regulations will not be accepted as an excuse for any transgression.

Please read the faculty regulations in conjunction with the General Regulations.

Academic literacy

It is expected of all new undergraduate students who wish to study at the University to sit for an academic literacy test. Certain modules which address shortcomings in this respect, are included in the undergraduate curriculum. In addition, modules which have the purpose of developing specific language and communication skills in the context of the requirements of the engineering profession are also included in the curriculum.

Change of field of study

Transfer from one field of study to another may only take place with the Dean's approval, after consultation with the relevant Head of Department.

Examinations

Examinations, projects and research reports/mini-dissertations

- i. An examination in a module may be written and/or oral. Projects and research reports/mini-dissertations are prepared and examined as stipulated in the study guide of the module, in accordance with the regulations and procedures as described below.
- ii. The examinations for modules of the first semester are held in May/June, while all other examinations (third and fourth-quarter modules, second semester modules and year modules) are held in October/November.

Examination admission

A minimum semester/year mark of 40% is required in order to be admitted to the final examination in a specific module, with the exception of first-semester modules at first-year level where a minimum semester mark of 30%

is required for admission to an examination. In addition, all other examination admission requirements, applicable to the relevant module, must have been met.

Special examinations (including the aegrotat)

Refer to G.12.5.

- i. A medical certificate stating that a student appeared ill or declared him/herself unfit to write the examination **will not be accepted**.
- ii. The doctor must be consulted **on or before the date** on which the examination was scheduled.

Ancillary examinations

Refer to G.12.3.

Please note: No ancillary or special examinations are granted in any design modules (all ONT modules) in the Department of Architecture.

Other special examinations

Refer also to G.12.6.

- i. The Dean may, on the recommendation of the relevant head of department, grant a special examination in a module to a student who failed that module in the final year of study, and consequently does not comply with degree requirements.
- ii. A student may at most, be admitted to either one special examination in a year module or two special examinations in semester modules or four special examinations in quarter modules. A student will be allowed to write a special examination for a specific module only once. Should the student fail the special examination the student needs to reregister for the module, in which case all regulations are applicable to the module enrolment.
- iii. To be taken into consideration for a special examination, a student should have written the examination and failed the module(s) and should also have complied with all other examination admission requirements which are applicable to the relevant module.
- iv. Extraordinary cases may be considered by the Dean. In this case a student must apply in writing to the Dean before consideration will be given for admission to a special examination. The relevant head of department decides when the special examination will take place and may prescribe work that must be satisfactorily completed before a student may write the examination.
- v. The candidate should also comply with the subminimum requirements. The highest final mark that may be awarded is 50%.
- vi. No special examinations will be allowed for modules with a project or design component in any discipline.

Please note:

- In the **School for the Built Environment**, the pass mark required for a special examination is 50%, a higher mark is not allocated and the semester/year mark is not taken into consideration.
- In the **School of Information Technology**: the pass mark required for a special examination is 50%, a higher mark is not allocated and the semester/year mark is not taken into consideration.
- In the **School of Engineering**: the semester mark is retained during calculation of the final mark and the final mark is calculated as the weighted average of the special examination mark and the semester mark, in accordance with the formula as published in the study guide of the specific module. No other special examinations are granted in the School of Engineering.

Re-marking of examination scripts

Refer to G.14.

Supplementary examinations in the School of Engineering

Refer to G.12.4.

In the School of Engineering a supplementary examination is only granted in instances where:

- i. A final mark of between 45% and 49% was achieved;
- ii. A final mark of between 40% and 44% was achieved and where the candidate also achieved either a semester mark or an examination mark of 50% or higher;
- iii. A pass mark has been obtained, but the required subminimum in the examination section of the module or divisions thereof has not been obtained.
- iv. A final mark of between 40% and 49% has been obtained in first-year modules in the first semester.

Calculation of the final supplementary examination mark:

- i. The semester mark is retained and the final mark is calculated as the weighted average of the supplementary examination mark and the semester mark, in accordance with the formula as published in the study manual of the specific module, with the proviso that the maximum final mark awarded may be no more than 50%. The only exception to this rule is in the case of first-year modules at first-semester level, where the semester mark is not considered, and where the supplementary examination mark is taken as the final mark, with the proviso that the maximum final mark awarded may be no more than 50%.
- ii. All other pass requirements, as published in the study manual of each specific module, remain so and are applicable during the determination of the final result of a supplementary examination in the module.

Special supplementary examinations will not be arranged for students who were not able to write the supplementary examinations during scheduled times, as given in the examinations timetable.

Supplementary examinations in the School for the Built Environment

Refer to G.12.4.

Except for first-semester modules in the first year where supplementary examinations are compulsory between 40% and 49%, a supplementary examination is only granted in instances where:

- i. a final mark of between 45% and 49% was obtained;
- ii. a final mark of between 40% and 44% was obtained and where the candidate also obtained either a semester mark or an examination mark of 50% or higher;
- iii. a pass mark has been obtained, but the required subminimum in the examination section of the module or divisions thereof has not been obtained.

G.12.4(i) to (iii) do not apply to third-year modules of any of the programmes in the Department of Architecture. No supplementary examinations are granted in any year of study for the design module (ONT modules).

Supplementary examinations in the School of Information Technology

Refer to G.12.4.

In the School of Information Technology all supplementary examinations are considered and granted in accordance with the stipulations of G Regulation G.12.4, and is calculated as follows:

- i. The semester mark is retained and the final mark is calculated as the weighted average of the supplementary examination mark and the semester mark, in accordance with the formula as published in the study manual of the specific module, with the proviso that the maximum final mark awarded may be no more than 50%. The only exception to this rule is in the case of first-year modules at first-semester level, where the semester mark is not considered, and where the supplementary examination mark is taken as the final mark, with the proviso that the maximum final mark awarded may be no more than 50%.
- ii. All other pass requirements, as published in the study manual of each specific module, remain so and are applicable during the determination of the final result of a supplementary examination in the module.

Special supplementary examinations will not be arranged for students who were not able to write the supplementary examinations during scheduled times, as provided in the examinations timetable.

Pass requirements

Refer also to G.11.1(a) and G.12.2.2

- a. In order to pass a module, a student must obtain an examination mark of at least 40% and a final mark of at least 50% except if stated otherwise in the study guide. A student passes a module with distinction if a final mark of at least 75% is obtained. The final mark is compiled from the semester/year mark and the examination mark.

Please note: In the School of Engineering, borderline cases (e.g. a mark of 49% or 74%) must be reconsidered by both the internal and external examiners, for determination of the possible merit of an upward adjustment of the mark. Marks may not be adjusted downwards, except when obvious marking and adding errors were detected. The pass mark is a minimum final mark of 50% and a student fails the module if a lower mark (e.g. 49%) was obtained.

- b. Calculation of the final mark: The semester/year mark must account for no less than 40% and no more than 60% of the final mark, with the exception of modules such as design and research projects and research reports/essays, as well as in modules where the development of general skills is the primary learning activity, where appropriate alternative norms are determined individually by schools or departments. The specific details and/or formula for the calculation of the final mark are set out in the study guide of each module. Also, a schedule listing this information (for all the modules presented in each school) will be compiled, for approval by the Dean.
- c. Calculation of the semester/year mark: The semester/year mark is compiled from formative assessment of learning activities such as assignments, presentations, practicals and group projects, as well as from class tests and semester tests. For each module the specific formula for the calculation of the semester/year mark is determined by the lecturer(s) responsible for the presentation of the module and the details are set out in the study guide. Also, a schedule listing this information for all the modules presented in each school will be compiled, for approval by the Dean.

Refer also to G.11.1(b).

- d. In some modules specific requirements in respect of certain components of the semester/year mark may be set in order for a student to pass the module (for example that satisfactory performance in and attendance of practical classes are required). Thus, even if a pass mark is obtained in the module, a pass is not granted unless these requirements are met. For such modules these specific requirements are set out in the study guide. Also, a schedule containing this information (for all such modules presented in each school) will be compiled, for approval by the Dean.
- e. A student must comply with the subminimum requirements in subdivisions of certain modules. For such modules these specific requirements are set out in the study guide of the module. Also, a schedule containing this information (for all such modules presented in each school) will be compiled, for approval by the Dean.
- f. A student may be promoted (exempted from the examination) in certain modules in the School of Information Technology should a specified semester/year mark (minimum 65%) be obtained. For such modules these specific requirements are set out in the study guide of the module. Refer also to G Regulation G.10.3.

Please note: G.10.3 is normally not applied by the School of Engineering and no promotion (exemption from the examination) is allowed in any module, except in special cases where permission of the Dean is required.

Academic progress regulations

- a. Students who, after repeating a year of study, fail to pass all outstanding modules in the year of repetition,

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- will be excluded and forfeit their right of admission.
- b. If the excluded students are to be readmitted, the Faculty Appeals Committee will determine the conditions of readmission.
 - c. No first-year students who have failed to achieve more than 30% of the total credits, excluding non-core modules, may enrol for Summer School.

Dean's Merit List

The Dean's Merit List will be published annually on the website of the Faculty and will contain the names of the students whose academic performance over the year has been excellent and deserves recognition. Letters of commendation will be sent to students who qualify for inclusion on the Dean's Merit List.

To be eligible for inclusion in the Dean's Merit List, a student in the School for Engineering must pass all the modules as prescribed in the curriculum of a specific year of study as published. A student registered for the first, second or third year of the four-year programme must obtain a minimum weighted average of 75% and a student registered on the first, second, third or fourth year of the five year programme must obtain a minimum weighted average of 75%.

Additional regulations and information for the School of Engineering

Selection

A selection procedure takes place prior to admission to any programme in the School of Engineering. Restrictions may be placed on the number of students admitted to the School and/or its departments. Postgraduate selection takes place as stipulated in the respective departmental rules.

Renewal of registration (Eng.4)

Should a student who is repeating a year of study, with the exception of first-year students, fail to obtain sufficient credits to be promoted to the subsequent year of study at the end of the year of repetition, he or she will forfeit his or her right to readmission. Students who forfeit the right to readmission, may apply in writing to the Admissions Committee for readmission to the Faculty. Provisions regarding promotion, including provisions for first-year students, appear in the regulations of the relevant fields of study.

Equivalent modules

A BEng student may be permitted by the Dean, on recommendation of the relevant head of department, to register for an equivalent module in an alternate semester, although the module is normally offered to the student's group in another semester, and providing that no timetable clashes occur.

Recognition of modules/study units passed at other tertiary institutions Refer to G.9.4 (b)

- i. for a bachelor's degree for which the period of attendance is four academic years, at least during the final two academic years;
- ii. Credit may be awarded for modules passed at another university in the third and fourth year, if this was preapproved by the Head of Department (based on substantially equivalent material and all outcomes achieved as prescribed by ECSA), for special arrangements and/or exchange programmes.

Duration of examinations in undergraduate modules in the School of Engineering

The duration of an examination in an 8-credit module will not exceed 90 minutes and in a 16-credit module will not exceed 180 minutes, except where special approval is granted by the Dean to exceed these limits.

The duration of a supplementary examination or a special examination in all under-graduate modules will not exceed 90 minutes, except where special approval is granted by the Dean to exceed this limit. In the event of an aegrotat, the duration of the examination can be extended to a maximum period of 180 minutes, depending on an arrangement made between the lecturer and the student.

Exposure to the practice of engineering (Eng. 8)

Engineering students are exposed in three ways to the practice of engineering during the course of their studies:

- a. Workshop practice – a module comprising a period at the end of the first year of study during which students are trained in workshop practice. Students in electrical, electronic and computer engineering attend the Introduction to Laboratory Measurements and Computer Simulations’ module.
- b. Practical training – specific periods of work at firms during which experience is gained in the practice of engineering. Students may deviate from this stipulation only with the permission of the Dean.
- c. Excursions – study excursions arranged for students to visit various engineering firms and installations in order to obtain insight into the industry. This training is compulsory. Details of the modules regarding these aspects of training are explained in the sections of this publication which deal with the curricula and syllabi of the various programmes.

Additional regulations and information for the School for the Built Environment

Selection

Selection takes place prior to admission to the following programmes in the School for the Built Environment:

- a. All undergraduate programmes: A restricted number of students are admitted to all undergraduate programmes.
- b. Postgraduate programmes: A restricted number of students are admitted to the following taught programmes: BArchHons, BIntHons, BLArchHons, BScHons (Applied Science), BScHons Quantity Surveying, BScHons Construction Management, MArch(Prof), MInt(Prof), ML(Prof), MSc (Applied Science), MSc Quantity Surveying, MSc Construction Management, MSc Real Estate, MSc Real Estate Retail Property and Master of Town and Regional Planning. Applications close on 31 October for South African students. Admission to the MSc and PhD programmes by research is subject to approval by the relevant head of department and the Dean.

International students

Applications close on 31 August for international students.

International students wanting to be considered for selection must have their qualifications audited and verified by the South African Qualifications Authority (SAQA). Those candidates wanting to register for professional postgraduate degree programmes for purposes of professional registration must further have their qualifications verified by the relevant registering council as to the equivalence of the registration category. All costs are for the direct account of the applicant. All documentation must accompany the application and be submitted before the closing date.

Please Note: Contact details for the various bodies are to be found on the relevant departmental web page.

Promotion requirements in the School for the Built Environment

- a. Students whose academic progress is not acceptable can be suspended from further studies. Refer to the following important regulations: G.3 and/or regulations as they appear for the applicable programmes.
- b. A student who is excluded from further studies in terms of the stipulations of the abovementioned regulations will be notified in writing by the Dean or admissions committee at the end of the relevant semester.
- c. A student who has been excluded from further studies may apply in writing to the admissions committee of the School for the Built Environment for readmission on or before 12 January.
- d. Should the student be readmitted by the admissions committee, strict conditions will be set which the student must comply with in order to proceed with studies.
- e. Should the student not be readmitted to further studies by the admissions committee, he/she will be informed in writing.
- f. Students who are not readmitted by the admissions committee have the right to appeal to the Senate Committee for Admission, Evaluation and Academic Support.

g. Any decision taken by the Senate Committee for Admission, Evaluation and Academic Support is final.

Dean's Merit List

The Dean's Merit List will be published annually on the website of the Faculty and will contain the names of students whose academic performance over the year has been excellent and deserves recognition. Letters of commendation will be sent to students who qualify for inclusion on the Dean's Merit List.

To be eligible for inclusion in the Dean's Merit List, a student in the School for the Built Environment must pass all the modules as prescribed in the curriculum of a specific year of study as published. A student registered for the first, second or the third year of the programme must obtain a minimum weighted average of 75% and a student registered for the first, second or third year of the four-year programme must obtain a minimum weighted average of 75%.

Additional regulations and information for the School of Information Technology

Selection

A selection procedure takes place prior to admission to the degree programmes in the School of Information Technology. The number of students admitted to the under-graduate programmes in the school may be limited. Postgraduate selection takes place in accordance with departmental policy.

Academic literacy

All first-year students in the School of Information Technology enroll for ALL 121, a specialised module in academic literacy for Information Technology. For students in the Four-year programmes, Language, life and study skills 1 and 2 are compulsory in both the first semester and second semester (LST 133 and LST 143).

Requirements for specific modules (IT.3)

A candidate who has:

- passed the Grade 12 examination in Mathematics with at least 50% will be admitted to WTW 134, WTW 115 and WTW 152, and 60% for WTW 114, WTW 126, WTW 158 and WTW 161 in Mathematics and to WST 111 etc. or obtained at least 3 (40-49%) for Mathematics in Grade 12, will be admitted to WTW 133 and WTW 143
- obtained at least 4 (50-59%) in Mathematics in the Grade 12 examination, or at least 50% in both Statistics 113, 123, will be admitted to Informatics 112; Economics 113, 123 and 120;
- obtained at least 5 (60-69%) in Mathematics, or obtained at least 4 (50 – 59%) in Mathematics and has passed WTW 133 and WTW 143, will be admitted to Informatics 154 and 171.
- not passed at least four Computer science modules at second-year level, will not be permitted to register for the Computer science modules at third-year level, unless special permission has been granted by the relevant head of department.

Minimum study period

The minimum period of study for the degree is indicated at the relevant degree programme. Students registering for a three-year degree, must complete the degree in a maximum of five years. Students registering for a four-year degree, must complete the degree in a maximum of six years.

Dean's Merit List

The Dean's Merit List will be published annually on the website of the Faculty and will contain the names of students whose academic performance over the year has been excellent and deserves recognition. Letters of commendation will be sent to students who qualify for inclusion on the Dean's Merit List.

To be eligible for inclusion in the Dean's Merit List, a student in the School of Information Technology must pass all the modules as prescribed in the curriculum of a specific year of study as published. A student registered for the first, second or third year of the programme must obtain a minimum weighted average of 75%.

Additional regulations and information for the Graduate School of Technology Management (GSTM)

Selection

A selection procedure takes place prior to admission to any programme in the GSTM. Restrictions may be placed on the number of students admitted to the School. Postgraduate selection takes place as stipulated in the respective departmental rules. (www.up.ac.za/gstm)

Supplementary examinations in the GSTM

Supplementary or special examinations are not granted in any modules at the GSTM.

Minimum/Maximum study period

The minimum period of study for the degree is indicated at the relevant degree programme. Students registering for the honours degree as well as master's degrees, must complete the degree in a maximum of three years.

Undergraduate Degree

BEng Chemical Engineering (12130002)

Minimum duration of study 4 years

Programme information

All fields of study of the BEng degree have been accredited by the Engineering Council of South Africa (ECSA), and comply with the academic requirements for registration as a professional engineer. The programmes are designed in accordance with the outcomes-based model as required by the South African Qualifications Authority (SAQA). The learning outcomes and contents of the programmes have been compiled in accordance with the latest accreditation standards (PE-60 and PE-61) of ECSA, which also comply with the SAQA requirements, and which are summarised as follows:

Learning outcomes of the BEng degree:

A graduate in engineering should be able to apply the following skills on an advanced level:

- a. Engineering problem solving.
- b. Application of specialist and fundamental knowledge, with specific reference to mathematics, basic sciences and engineering sciences.
- c. Engineering design and synthesis.
- d. Investigation, experimentation and data analysis.
- e. Engineering methods, skills, tools and information technology.
- f. Professional and general communication.
- g. Awareness and knowledge of the impact of engineering activity on society and the physical environment.
- h. Work in teams and in multidisciplinary environments.
- i. An awareness and ability for lifelong learning.
- j. An awareness and knowledge of principles of professional ethics and practice.
- k. Awareness and knowledge of engineering management principles and economic decision-making.

Learning contents of the BEng programmes:

Six essential knowledge areas are included in the syllabi of the programmes. The typical representation of each knowledge area as a percentage of the total contents of an undergraduate programme is given in brackets () in the list below. This percentage varies for the different study directions, but conforms in all instances to the minimum knowledge area content as stipulated by ECSA.

Knowledge areas:

- a. Mathematics, including numerical methods and statistics (13%)
- b. Basic sciences: the natural sciences essential to the programme (15%)
- c. Engineering sciences (40%)
- d. Engineering design and synthesis (16%)
- e. Computing and information technology (5%)
- f. Complementary studies: communication, economy, management, innovation, environmental impact, ethics, engineering practice (11%).

Admission requirements

- The following persons will be considered for admission: candidates who are in possession of a certificate that is

deemed by the University to be equivalent to the required Grade 12 certificate with university endorsement; candidates who are graduates from another tertiary institution or have been granted the status of a graduate of such an institution; and candidates who are graduates of another faculty at the University of Pretoria.

- Life Orientation is excluded when calculating the APS.
- Grade 11 results are used in the conditional admission of prospective students.
- A valid qualification with admission to degree studies is required.
- Minimum subject and achievement requirements, as set out below, are required.
- Conditional admission to the four-year programmes in the School of Engineering is only guaranteed if a prospective student complies with ALL the requirements below.?
- **Note:** Candidates who do not comply with the minimum requirements, set out above, but who have obtained a minimum APS of 30, an achievement level of 5 for English, 6 for Mathematics and 5 for Physical Science, will be considered for conditional admission to either the four-year programme or the ENGAGE programme based on the results of the NBT.
- Admission to ENGAGE in the School of Engineering will be determined by the results of the NBT, NSC results, an achievement level of 5 in Mathematics and 5 in Physical Science, as well as an achievement level of 5 in English, together with an APS of 30.
- Students may apply directly to be considered for the ENGAGE programme.
- Tuition will be presented in English only.

Minimum requirements

Achievement level

English Home

Language or

English First

Additional

Language

		Mathematics		Physical Science		APS
NSC/IEB	AS Level	NSC/IEB	AS Level	NSC/IEB	AS Level	
5	C	6	B	6	B	35

* Cambridge A level candidates who obtained at least a D in the required subjects, will be considered for admission. International Baccalaureate (IB) HL candidates who obtained at least a 4 in the required subjects, will be considered for admission.

ENGAGE Programme minimum requirements

Achievement level

English Home

Language or

English First

Additional

Language

		Mathematics		Physical Science		APS
NSC/IEB	AS Level	NSC/IEB	AS Level	NSC/IEB	AS Level	
5	C	5	C	5	C	30

Other programme-specific information

With a few exceptions, most modules offered at the School of Engineering are semester modules having credit values of either 8 or 16.

A student may be permitted by the Dean, on recommendation of the relevant head of department, to register for

an equivalent module in an alternate semester, although the module is normally offered to the student's group in another semester, and providing that no timetable clashes occur.

Please note:

1. All students are required to successfully complete JCP 203, Community-based project 203, as part of the requirements for the BEng degree. A student may register for the module during any of the years of study of the programme, but preferably not during the first or the final year of study.
2. Students registered for Chemical Engineering who have passed CBI 311 or CBI 410, receive credit for CBI 310.
3. Mechanical Engineering: For the Aeronautical Option, the themes of both the Design and the Project must be aeronautical-related.
4. Offering of electives depends on the availability of resources and industry support.

Promotion to next study year

Promotion to the second semester of the first year and to the second year of study (Eng. 14)

- a. A new first-year student who has failed in all the prescribed modules of the programme at the end of the first semester, is excluded from studies in the School of Engineering. A student who is registered for the Engineering Augmented Degree Programme and has passed only 8 credits will also be excluded.
- b. A student who complies with all the requirements of the first year of study, is promoted to the second year of study.
- c. A student who has not passed at least 70% of the credits of the first year of study after the November examinations, must reapply for admission should he/she intend to proceed with his/her studies. Application on the prescribed form must be submitted to the Student Administration of the School of Engineering not later than 11 January. Late applications will be accepted only in exceptional circumstances after approval by the Dean. Should first-year students be readmitted, conditions of readmission will be determined by the Admissions Committee.
- d. Students who have not passed all the prescribed modules at first year level (level 100), as well as students who are readmitted in terms of Faculty Regulations must register for the outstanding first-year level (level-100) modules.
- e. A student who is repeating his or her first year, may, on recommendation of the relevant heads of department and with the approval of the Dean, be permitted to enroll for modules of the second-year of study in addition to the first-year modules which he or she failed, providing that he or she complies with the prerequisites for the second-year modules and no timetable clashes occur. Students on the ENGAGE programme may, following the same procedure, be permitted to enrol for level-200 modules in addition to the level-100 modules which he/she failed providing that he/she complies with the prerequisites for the modules at 200-level and no timetable clashes occur. On recommendation of the relevant head of department and with special permission from the Dean, permission may be granted to exceed the prescribed number of credits. The total number of credits which may be approved may not exceed the normal number of credits per semester by more than 16 credits.
- f. Students in Computer, Electrical and Electronic Engineering, who fail a first-year module for the second time, forfeit the privilege of registering for any modules of an advanced year of study.

Please note:

- i. From the second year of study each student should be in possession of an approved calculator. It is assumed that each student will have easy access to a laptop computer.

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- ii. Students who intend transferring to Mining Engineering, must familiarise themselves with the stipulations set out in the syllabi of PWP 121 Workshop practice 121.

Promotion to the third year of study of the Four-year Programme, as well as to the third and the fourth years of study of the ENGAGE Programme. In case of the fourth year of study of the ENGAGE Programme, the words "first", "second" and "third" must be substituted with the words "second", "third" and "fourth" respectively. (Eng. 15)

- a. A student who complies with all the requirements of the second year of study, is promoted to the third year of study.
- b. A student must pass all the prescribed modules at first year level (level 100) before he or she is admitted to any module at third year level (level 300).
- c. A student who is repeating his or her second year must register for all the second-year modules still outstanding. Such a student may, on recommendation of the relevant head of department and with the approval of the Dean, be permitted to enroll for modules of the third year of study in addition to the second-year modules which he or she failed, providing that he or she complies with the prerequisites for the third-year modules and no timetable clashes occur. On recommendation of the relevant head of department, and with special permission from the Dean, permission may be granted to exceed the prescribed number of credits. The total number of credits which may be approved may not exceed the normal number of credits per semester by more than 16 credits.
- d. Students in Computer, Electrical and Electronic Engineering who fail a second-year module for the second time forfeit the privilege of registering for any modules of the third year of study.
- e. Students who intend transferring to Mining Engineering must familiarise themselves with the stipulations set out in the syllabi of PWP 120 Workshop practice 120, as well as PPY 317 Practical training 317.

Promotion to the fourth year of study of the Four-year Programme, as well as to the fifth year of study of the ENGAGE Programme. In case of the fifth year of study of the ENGAGE Programme, the words "second", "third" and "fourth" must be substituted with the words "third", "fourth" and "fifth" respectively. (Eng. 16)

- a. A student who complies with all the requirements of the third year of study is promoted to the fourth year of study. A student who does not comply with all the requirements but who is able to register for all outstanding modules in order to complete the degree programme, may at registration be promoted to the fourth year of study.
- b. A student must pass all the prescribed modules of the second year of study, before he or she is admitted to any module of the fourth year of study.
- c. A student who has not passed all the prescribed modules of the third year of study, must register for the outstanding modules. A student may be admitted by the Dean, on the recommendation of the relevant head of department, to modules of the fourth year of study, in addition to the outstanding third-year modules, provided that he or she complies with the prerequisites of the fourth-year modules and no timetable clashes occur. The total number of credits per semester for which a student registers may not exceed the normal number of credits per semester by more than 16 credits. In exceptional cases, the Dean may, on recommendation of the relevant head of department, permit a student to exceed the above limit.
- d. Students in Computer, Electrical and Electronic Engineering who fail a third-year module for the second time, forfeit the privilege of registering for any modules of the fourth year of study.

Pass with distinction

- a. A student graduates with distinction if:
 - i. no module of the third or fourth year of study of the four year programme or of the fourth or fifth year of the ENGAGE programme was repeated and a weighted average of at least 75% was obtained in one year in all the modules of the final year of study; and
 - ii. the degree programme was completed within the prescribed four years for the four year programme and within the prescribed five years of the ENGAGE programme.
- b. Exceptional cases to the above will be considered by the Dean.

Curriculum: Year 1

Minimum credits: 160

Fundamental modules

[Academic orientation 112](#) (UPO 112) - Credits: 0.00

Core modules

[General chemistry 171](#) (CHM 171) - Credits: 16.00

[General chemistry 181](#) (CHM 181) - Credits: 16.00

[Chemical engineering 113](#) (CIR 113) - Credits: 8.00

[Chemical engineering 123](#) (CIR 123) - Credits: 8.00

[Electricity and electronics 122](#) (EBN 122) - Credits: 16.00

[Physics 116](#) (FSK 116) - Credits: 16.00

[Humanities and social sciences 110](#) (HAS 110) - Credits: 8.00

[Humanities and social sciences 120](#) (HAS 120) - Credits: 8.00

[Graphical communication 110](#) (MGC 110) - Credits: 16.00

[Mechanics 122](#) (SWK 122) - Credits: 16.00

[Calculus 158](#) (WTW 158) - Credits: 16.00

[Mathematics 164](#) (WTW 164) - Credits: 16.00

[Workshop practice 121](#) (WWP 121) - Credits: 6.00

Curriculum: Year 2

Minimum credits: 162

Core modules

[Engineering statistics 220](#) (BES 220) - Credits: 8.00

[Chemistry 215](#) (CHM 215) - Credits: 12.00

[Chemistry 226](#) (CHM 226) - Credits: 8.00

[Chemical engineering materials 210](#) (CIM 210) - Credits: 8.00

[Chemical engineering 211](#) (CIR 211) - Credits: 12.00

[Thermodynamics 223](#) (CTD 223) - Credits: 16.00

[Electrical engineering 221](#) (EIR 221) - Credits: 16.00

[Community-based project 203](#) (JCP 203) - Credits: 8.00

[Programming and information technology 213](#) (MPR 213) - Credits: 16.00

[Strength of materials 210](#) (SWK 210) - Credits: 16.00

[Mathematics 238](#) (WTW 238) - Credits: 16.00

Differential equations 256 (WTW 256) - Credits: 8.00

Calculus 258 (WTW 258) - Credits: 8.00

Numerical methods 263 (WTW 263) - Credits: 8.00

Curriculum: Year 3

Minimum credits: 144

Core modules

Engineering management 310 (BSS 310) - Credits: 8.00

Biochemical engineering 310 (CBI 310) - Credits: 16.00

Chemical engineering design 320 (CIO 320) - Credits: 16.00

Chemical engineering 310 (CIR 310) - Credits: 8.00

Professional and technical communication 310 (CJJ 310) - Credits: 8.00

Kinetics 321 (CKN 321) - Credits: 16.00

Laboratory 321 (CLB 321) - Credits: 16.00

Mass transfer 310 (CMO 310) - Credits: 16.00

Transfer processes 311 (COP 311) - Credits: 16.00

Process dynamics 321 (CPN 321) - Credits: 16.00

Practical training 311 (CPY 311) - Credits: 16.00

Engineering activity and group work 320 (MIA 320) - Credits: 8.00

Curriculum: Final year

Minimum credits: 144

Core modules

Particle technology 410 (CPA 410) - Credits: 16.00

Process control 410 (CPB 410) - Credits: 16.00

Design project 421 (CPJ 421) - Credits: 24.00

Chemical engineering practice 420 (CPR 420) - Credits: 8.00

Process synthesis 410 (CPS 410) - Credits: 8.00

Process analysis 420 (CPS 420) - Credits: 8.00

Practical training 411 (CPY 411) - Credits: 16.00

Reactor design 410 (CRO 410) - Credits: 16.00

Research project 411 (CSC 411) - Credits: 16.00

Research project 421 (CSC 421) - Credits: 16.00

Specialisation 420 (CSS 420) - Credits: 16.00

BEng Chemical Engineering ENGAGE (12136002)

Minimum duration of study 5 years

Programme information

Please note: The Engineering Augmented Degree Programme (ENGAGE) is an extended degree programme with a five-year curriculum. It is designed to enable students who show academic potential but who do not meet the normal entry requirements for the four-year degree programme, to obtain an Engineering degree. ENGAGE students spend the first three years of the programme covering the content of the first two years of the four-year degree programme. They also take compulsory augmented modules in each of the Level 1 subjects. These augmented modules provide students with background knowledge and skills needed to succeed in an

engineering degree. The curriculum for years four and five of the ENGAGE programme are identical to the curriculum for years 3 and 4 of the 4-year programme, respectively. Students may apply directly for admission to the programme.

- Students must register for the entire programme, not components of it. The curriculum is fixed; there are no electives.
- Attendance at all components of years 1 to 3 of the programme is compulsory. Non-attendance will only be condoned in the case of illness (sick note required) or family crisis (e.g. a death in the family), in which case students must inform the programme administration immediately.
- Students who fail to meet the attendance requirement for any module in any semester of years 1 to 3 of the programme will be excluded from the programme.
- No augmented module may be repeated more than once.
- Selection into the programme will be based on a combination of performance in the National Senior Certificate examinations or equivalent and other selection tests approved by the faculty.
- A student who fails a mainstream module (e.g. Chemistry) but passes the associated augmented module (e.g. Additional chemistry) does not need to repeat the augmented module.
- A student who fails an augmented module (e.g. Additional chemistry) but passes the associated mainstream module (e.g. Chemistry) does not need to repeat the mainstream module.
- A student must meet the attendance requirement and obtain at least 40% for both the continuous assessment and test components as well as a final mark of 50% in order to pass an augmented module.
- i. The curricula of the fourth and the fifth years of study are identical to those of the third and the fourth years of the four-year programme.
- ii. JPO 110 is a prerequisite for JPO 120. Credit for JPO is obtained with a final mark of more than 50%.
Conditional admission to JPO 120: If the final mark for JPO 110 is between 45% and 49%, a student can register for JPO 120 but credit for JPO 110 and JPO 120 will only be obtained if the final combined mark for JPO 110 and JPO 120 is above 50%.

Please note: All students will be required to successfully complete JCP 203, Community-based project 203, as part of the requirements for the BEng degree. A student may register for the module during any of the years of study of the programme, but preferably not during the first or the final year of study.

Learning outcomes of the BEng degree:

A graduate in engineering should be able to apply the following skills on an advanced level:

- a. Engineering problem solving.
- b. Application of specialist and fundamental knowledge, with specific reference to mathematics, basic sciences and engineering sciences.
- c. Engineering design and synthesis.
- d. Investigation, experimentation and data analysis.
- e. Engineering methods, skills, tools and information technology.
- f. Professional and general communication.
- g. Awareness and knowledge of the impact of engineering activity on society and the physical environment.
- h. Work in teams and in multidisciplinary environments.
- i. An awareness and ability for lifelong learning.
- j. An awareness and knowledge of principles of professional ethics and practice.
- k. Awareness and knowledge of engineering management principles and economic decision-making.

Learning contents of the BEng programmes:

Six essential knowledge areas are included in the syllabi of the programmes. The typical representation of each

knowledge area as a percentage of the total contents of an undergraduate programme is given in brackets () in the list below. This percentage varies for the different study directions, but conforms in all instances to the minimum knowledge area content as stipulated by ECSA.

Knowledge areas:

- a. Mathematics, including numerical methods and statistics (13%)
- b. Basic sciences: the natural sciences essential to the programme (15%)
- c. Engineering sciences (40%)
- d. Engineering design and synthesis (16%)
- e. Computing and information technology (5%)
- f. Complementary studies: communication, economy, management, innovation, environmental impact, ethics, engineering practice (11%).

Promotion to next study year

Promotion to the second semester of the first year and to the second year of study (Eng. 14)

- a. A new first-year student who has failed in all the prescribed modules of the programme at the end of the first semester, is excluded from studies in the School of Engineering. A student who is registered for the Engineering Augmented Degree Programme and has passed only 8 credits will also be excluded.
- b. A student who complies with all the requirements of the first year of study, is promoted to the second year of study.
- c. A student who has not passed at least 70% of the credits of the first year of study after the November examinations, must reapply for admission should he/she intend to proceed with his/her studies. Application on the prescribed form must be submitted to the Student Administration of the School of Engineering not later than 11 January. Late applications will be accepted only in exceptional circumstances after approval by the Dean. Should first-year students be readmitted, conditions of readmission will be determined by the Admissions Committee.
- d. Students who have not passed all the prescribed modules at first year level (level 100), as well as students who are readmitted in terms of Faculty Regulations must register for the outstanding first-year level (level-100) modules.
- e. A student who is repeating his or her first year, may, on recommendation of the relevant heads of department and with the approval of the Dean, be permitted to enroll for modules of the second-year of study in addition to the first-year modules which he or she failed, providing that he or she complies with the prerequisites for the second-year modules and no timetable clashes occur. Students on the ENGAGE programme may, following the same procedure, be permitted to enrol for level-200 modules in addition to the level-100 modules which he/she failed providing that he/she complies with the prerequisites for the modules at 200-level and no timetable clashes occur. On recommendation of the relevant head of department and with special permission from the Dean, permission may be granted to exceed the prescribed number of credits. The total number of credits which may be approved may not exceed the normal number of credits per semester by more than 16 credits.
- f. Students in Computer, Electrical and Electronic Engineering, who fail a first-year module for the second time, forfeit the privilege of registering for any modules of an advanced year of study.

Please note:

- i. From the second year of study each student should be in possession of an approved calculator. It is assumed that each student will have easy access to a laptop computer.

-
- ii. Students who intend transferring to Mining Engineering, must familiarise themselves with the stipulations set out in the syllabi of PWP 121 Workshop practice 121.

Promotion to the third year of study of the Four-year Programme, as well as to the third and the fourth years of study of the ENGAGE Programme. In case of the fourth year of study of the ENGAGE Programme, the words "first", "second" and "third" must be substituted with the words "second", "third" and "fourth" respectively. (Eng. 15)

- a. A student who complies with all the requirements of the second year of study, is promoted to the third year of study.
- b. A student must pass all the prescribed modules at first year level (level 100) before he or she is admitted to any module at third year level (level 300).
- c. A student who is repeating his or her second year must register for all the second-year modules still outstanding. Such a student may, on recommendation of the relevant head of department and with the approval of the Dean, be permitted to enroll for modules of the third year of study in addition to the second-year modules which he or she failed, providing that he or she complies with the prerequisites for the third-year modules and no timetable clashes occur. On recommendation of the relevant head of department, and with special permission from the Dean, permission may be granted to exceed the prescribed number of credits. The total number of credits which may be approved may not exceed the normal number of credits per semester by more than 16 credits.
- d. Students in Computer, Electrical and Electronic Engineering who fail a second-year module for the second time forfeit the privilege of registering for any modules of the third year of study.
- e. Students who intend transferring to Mining Engineering must familiarise themselves with the stipulations set out in the syllabi of PWP 120 Workshop practice 120, as well as PPY 317 Practical training 317.

Promotion to the fourth year of study of the Four-year Programme, as well as to the fifth year of study of the ENGAGE Programme. In case of the fifth year of study of the ENGAGE Programme, the words "second", "third" and "fourth" must be substituted with the words "third", "fourth" and "fifth" respectively. (Eng. 16)

- a. A student who complies with all the requirements of the third year of study is promoted to the fourth year of study. A student who does not comply with all the requirements but who is able to register for all outstanding modules in order to complete the degree programme, may at registration be promoted to the fourth year of study.
- b. A student must pass all the prescribed modules of the second year of study, before he or she is admitted to any module of the fourth year of study.
- c. A student who has not passed all the prescribed modules of the third year of study, must register for the outstanding modules. A student may be admitted by the Dean, on the recommendation of the relevant head of department, to modules of the fourth year of study, in addition to the outstanding third-year modules, provided that he or she complies with the prerequisites of the fourth-year modules and no timetable clashes occur. The total number of credits per semester for which a student registers may not exceed the normal number of credits per semester by more than 16 credits. In exceptional cases, the Dean may, on recommendation of the relevant head of department, permit a student to exceed the above limit.
- d. Students in Computer, Electrical and Electronic Engineering who fail a third-year module for the second time, forfeit the privilege of registering for any modules of the fourth year of study.

Pass with distinction

- a. A student graduates with distinction if:
 - i. no module of the third or fourth year of study of the four year programme or of the fourth or fifth year of the ENGAGE programme was repeated and a weighted average of at least 75% was obtained in one year in all the modules of the final year of study; and
 - ii. the degree programme was completed within the prescribed four years for the four year programme and within the prescribed five years of the ENGAGE programme.
- b. Exceptional cases to the above will be considered by the Dean.

Curriculum: Year 1

Minimum credits: 128

Fundamental modules

[Academic orientation 112](#) (UPO 112) - Credits: 0.00

Core modules

[General chemistry 171](#) (CHM 171) - Credits: 16.00

[Physics 176](#) (FSK 176) - Credits: 16.00

[Humanities and social sciences 110](#) (HAS 110) - Credits: 8.00

[Humanities and social sciences 120](#) (HAS 120) - Credits: 8.00

[Professional orientation 110](#) (JPO 110) - Credits: 8.00

[Additional Chemistry 1 111](#) (JPO 111) - Credits: 8.00

[Additional Mathematics 1 116](#) (JPO 116) - Credits: 8.00

[Professional orientation 120](#) (JPO 120) - Credits: 8.00

[Additional Physics 122](#) (JPO 122) - Credits: 8.00

[Additional Mathematics 2 126](#) (JPO 126) - Credits: 8.00

[Calculus 158](#) (WTW 158) - Credits: 16.00

[Mathematics 164](#) (WTW 164) - Credits: 16.00

[Workshop practice 121](#) (WWP 121) - Credits: 6.00

Curriculum: Year 2

Minimum credits: 136

Core modules

[General chemistry 181](#) (CHM 181) - Credits: 16.00

[Chemical engineering 113](#) (CIR 113) - Credits: 8.00

[Chemical engineering 123](#) (CIR 123) - Credits: 8.00

[Electricity and electronics 111](#) (EBN 111) - Credits: 16.00

[Community-based project 203](#) (JCP 203) - Credits: 8.00

[Additional Electricity and electronics 112](#) (JPO 112) - Credits: 8.00

[Additional Graphical communication 113](#) (JPO 113) - Credits: 8.00

[Additional Chemistry 2 121](#) (JPO 121) - Credits: 8.00

[Additional Mechanics 125](#) (JPO 125) - Credits: 8.00

[Graphical communication 110](#) (MGC 110) - Credits: 16.00

[Mechanics 122](#) (SWK 122) - Credits: 16.00

Calculus 258 (WTW 258) - Credits: 8.00
Numerical methods 263 (WTW 263) - Credits: 8.00

Curriculum: Year 3

Minimum credits: 138

Core modules

Engineering statistics 220 (BES 220) - Credits: 8.00
Chemistry 215 (CHM 215) - Credits: 12.00
Chemistry 226 (CHM 226) - Credits: 8.00
Chemical engineering materials 210 (CIM 210) - Credits: 8.00
Chemical engineering 211 (CIR 211) - Credits: 12.00
Thermodynamics 223 (CTD 223) - Credits: 16.00
Electrical engineering 221 (EIR 221) - Credits: 16.00
Programming and information technology 213 (MPR 213) - Credits: 16.00
Strength of materials 210 (SWK 210) - Credits: 16.00
Mathematics 238 (WTW 238) - Credits: 16.00
Differential equations 256 (WTW 256) - Credits: 8.00

Curriculum: Year 4

Minimum credits: 144

Core modules

Engineering management 310 (BSS 310) - Credits: 8.00
Biochemical engineering 310 (CBI 310) - Credits: 16.00
Chemical engineering design 320 (CIO 320) - Credits: 16.00
Chemical engineering 310 (CIR 310) - Credits: 8.00
Professional and technical communication 310 (CJJ 310) - Credits: 8.00
Kinetics 321 (CKN 321) - Credits: 16.00
Laboratory 321 (CLB 321) - Credits: 16.00
Mass transfer 310 (CMO 310) - Credits: 16.00
Transfer processes 311 (COP 311) - Credits: 16.00
Process dynamics 321 (CPN 321) - Credits: 16.00
Practical training 311 (CPY 311) - Credits: 16.00
Engineering activity and group work 320 (MIA 320) - Credits: 8.00

Curriculum: Final year

Minimum credits: 144

Core modules

Particle technology 410 (CPA 410) - Credits: 16.00
Process control 410 (CPB 410) - Credits: 16.00
Design project 421 (CPJ 421) - Credits: 24.00
Chemical engineering practice 420 (CPR 420) - Credits: 8.00
Process synthesis 410 (CPS 410) - Credits: 8.00
Process analysis 420 (CPS 420) - Credits: 8.00
Practical training 411 (CPY 411) - Credits: 16.00
Reactor design 410 (CRO 410) - Credits: 16.00

Research project 411 (CSC 411) - Credits: 16.00

Research project 421 (CSC 421) - Credits: 16.00

Specialisation 420 (CSS 420) - Credits: 16.00

BEng Civil Engineering (12130007)

Minimum duration of study 4 years

Programme information

All fields of study of the BEng degree have been accredited by the Engineering Council of South Africa (ECSA), and comply with the academic requirements for registration as a professional engineer. The programmes are designed in accordance with the outcomes-based model as required by the South African Qualifications Authority (SAQA). The learning outcomes and contents of the programmes have been compiled in accordance with the latest accreditation standards (PE-60 and PE-61) of ECSA, which also comply with the SAQA requirements, and which are summarised as follows:

Learning outcomes of the BEng degree:

A graduate in engineering should be able to apply the following skills on an advanced level:

- a. Engineering problem solving.
- b. Application of specialist and fundamental knowledge, with specific reference to mathematics, basic sciences and engineering sciences.
- c. Engineering design and synthesis.
- d. Investigation, experimentation and data analysis.
- e. Engineering methods, skills, tools and information technology.
- f. Professional and general communication.
- g. Awareness and knowledge of the impact of engineering activity on society and the physical environment.
- h. Work in teams and in multidisciplinary environments.
- i. An awareness and ability for lifelong learning.
- j. An awareness and knowledge of principles of professional ethics and practice.
- k. Awareness and knowledge of engineering management principles and economic decision-making.

Learning contents of the BEng programmes:

Six essential knowledge areas are included in the syllabi of the programmes. The typical representation of each knowledge area as a percentage of the total contents of an undergraduate programme is given in brackets () in the list below. This percentage varies for the different study directions, but conforms in all instances to the minimum knowledge area content as stipulated by ECSA.

Knowledge areas:

- a. Mathematics, including numerical methods and statistics (13%)
- b. Basic sciences: the natural sciences essential to the programme (15%)
- c. Engineering sciences (40%)
- d. Engineering design and synthesis (16%)
- e. Computing and information technology (5%)
- f. Complementary studies: communication, economy, management, innovation, environmental impact, ethics, engineering practice (11%).

Admission requirements

- The following persons will be considered for admission: candidates who are in possession of a certificate that is deemed by the University to be equivalent to the required Grade 12 certificate with university endorsement; candidates who are graduates from another tertiary institution or have been granted the status of a graduate of such an institution; and candidates who are graduates of another faculty at the University of Pretoria.
- Life Orientation is excluded when calculating the APS.
- Grade 11 results are used in the conditional admission of prospective students.
- A valid qualification with admission to degree studies is required.
- Minimum subject and achievement requirements, as set out below, are required.
- Conditional admission to the four-year programmes in the School of Engineering is only guaranteed if a prospective student complies with ALL the requirements below.?
- **Note:** Candidates who do not comply with the minimum requirements, set out above, but who have obtained a minimum APS of 30, an achievement level of 5 for English, 6 for Mathematics and 5 for Physical Science, will be considered for conditional admission to either the four-year programme or the ENGAGE programme based on the results of the NBT.
- Admission to ENGAGE in the School of Engineering will be determined by the results of the NBT, NSC results, an achievement level of 5 in Mathematics and 5 in Physical Science, as well as an achievement level of 5 in English, together with an APS of 30.
- Students may apply directly to be considered for the ENGAGE programme.
- Tuition will be presented in English only.

Minimum requirements

Achievement level

English Home

Language or

English First

Additional

Language

		Mathematics		Physical Science		APS
NSC/IEB	AS Level	NSC/IEB	AS Level	NSC/IEB	AS Level	
5	C	6	B	6	B	35

* Cambridge A level candidates who obtained at least a D in the required subjects, will be considered for admission. International Baccalaureate (IB) HL candidates who obtained at least a 4 in the required subjects, will be considered for admission.

ENGAGE Programme minimum requirements

Achievement level

English Home

Language or

English First

Additional

Language

		Mathematics		Physical Science		APS
NSC/IEB	AS Level	NSC/IEB	AS Level	NSC/IEB	AS Level	
5	C	5	C	5	C	30

Other programme-specific information

With a few exceptions, most modules offered at the School of Engineering are semester modules having credit values of either 8 or 16.

A student may be permitted by the Dean, on recommendation of the relevant head of department, to register for an equivalent module in an alternate semester, although the module is normally offered to the student's group in another semester, and providing that no timetable clashes occur.

Please note:

1. All students are required to successfully complete JCP 203, Community-based project 203, as part of the requirements for the BEng degree. A student may register for the module during any of the years of study of the programme, but preferably not during the first or the final year of study.
2. Students registered for Chemical Engineering who have passed CBI 311 or CBI 410, receive credit for CBI 310.
3. Mechanical Engineering: For the Aeronautical Option, the themes of both the Design and the Project must be aeronautical-related.
4. Offering of electives depends on the availability of resources and industry support.

Promotion to next study year

Promotion to the second semester of the first year and to the second year of study (Eng. 14)

- a. A new first-year student who has failed in all the prescribed modules of the programme at the end of the first semester, is excluded from studies in the School of Engineering. A student who is registered for the Engineering Augmented Degree Programme and has passed only 8 credits will also be excluded.
- b. A student who complies with all the requirements of the first year of study, is promoted to the second year of study.
- c. A student who has not passed at least 70% of the credits of the first year of study after the November examinations, must reapply for admission should he/she intend to proceed with his/her studies. Application on the prescribed form must be submitted to the Student Administration of the School of Engineering not later than 11 January. Late applications will be accepted only in exceptional circumstances after approval by the Dean. Should first-year students be readmitted, conditions of readmission will be determined by the Admissions Committee.
- d. Students who have not passed all the prescribed modules at first year level (level 100), as well as students who are readmitted in terms of Faculty Regulations must register for the outstanding first-year level (level-100) modules.
- e. A student who is repeating his or her first year, may, on recommendation of the relevant heads of department and with the approval of the Dean, be permitted to enroll for modules of the second-year of study in addition to the first-year modules which he or she failed, providing that he or she complies with the prerequisites for the second-year modules and no timetable clashes occur. Students on the ENGAGE programme may, following the same procedure, be permitted to enrol for level-200 modules in addition to the level-100 modules which he/she failed providing that he/she complies with the prerequisites for the modules at 200-level and no timetable clashes occur. On recommendation of the relevant head of department and with special permission from the Dean, permission may be granted to exceed the prescribed number of credits. The total number of credits which may be approved may not exceed the normal number of credits per semester by more than 16 credits.
- f. Students in Computer, Electrical and Electronic Engineering, who fail a first-year module for the second time, forfeit the privilege of registering for any modules of an advanced year of study.

Please note:

- i. From the second year of study each student should be in possession of an approved calculator. It is assumed

that each student will have easy access to a laptop computer.

- ii. Students who intend transferring to Mining Engineering, must familiarise themselves with the stipulations set out in the syllabi of PWP 121 Workshop practice 121.

Promotion to the third year of study of the Four-year Programme, as well as to the third and the fourth years of study of the ENGAGE Programme. In case of the fourth year of study of the ENGAGE Programme, the words "first", "second" and "third" must be substituted with the words "second", "third" and "fourth" respectively. (Eng. 15)

- a. A student who complies with all the requirements of the second year of study, is promoted to the third year of study.
- b. A student must pass all the prescribed modules at first year level (level 100) before he or she is admitted to any module at third year level (level 300).
- c. A student who is repeating his or her second year must register for all the second-year modules still outstanding. Such a student may, on recommendation of the relevant head of department and with the approval of the Dean, be permitted to enroll for modules of the third year of study in addition to the second-year modules which he or she failed, providing that he or she complies with the prerequisites for the third-year modules and no timetable clashes occur. On recommendation of the relevant head of department, and with special permission from the Dean, permission may be granted to exceed the prescribed number of credits. The total number of credits which may be approved may not exceed the normal number of credits per semester by more than 16 credits.
- d. Students in Computer, Electrical and Electronic Engineering who fail a second-year module for the second time forfeit the privilege of registering for any modules of the third year of study.
- e. Students who intend transferring to Mining Engineering must familiarise themselves with the stipulations set out in the syllabi of PWP 120 Workshop practice 120, as well as PPY 317 Practical training 317.

Promotion to the fourth year of study of the Four-year Programme, as well as to the fifth year of study of the ENGAGE Programme. In case of the fifth year of study of the ENGAGE Programme, the words "second", "third" and "fourth" must be substituted with the words "third", "fourth" and "fifth" respectively. (Eng. 16)

- a. A student who complies with all the requirements of the third year of study is promoted to the fourth year of study. A student who does not comply with all the requirements but who is able to register for all outstanding modules in order to complete the degree programme, may at registration be promoted to the fourth year of study.
- b. A student must pass all the prescribed modules of the second year of study, before he or she is admitted to any module of the fourth year of study.
- c. A student who has not passed all the prescribed modules of the third year of study, must register for the outstanding modules. A student may be admitted by the Dean, on the recommendation of the relevant head of department, to modules of the fourth year of study, in addition to the outstanding third-year modules, provided that he or she complies with the prerequisites of the fourth-year modules and no timetable clashes occur. The total number of credits per semester for which a student registers may not exceed the normal number of credits per semester by more than 16 credits. In exceptional cases, the Dean may, on recommendation of the relevant head of department, permit a student to exceed the above limit.
- d. Students in Computer, Electrical and Electronic Engineering who fail a third-year module for the second time, forfeit the privilege of registering for any modules of the fourth year of study.

Pass with distinction

- a. A student graduates with distinction if:
 - i. no module of the third or fourth year of study of the four year programme or of the fourth or fifth year of the ENGAGE programme was repeated and a weighted average of at least 75% was obtained in one year in all the modules of the final year of study; and
 - ii. the degree programme was completed within the prescribed four years for the four year programme and within the prescribed five years of the ENGAGE programme.
- b. Exceptional cases to the above will be considered by the Dean.

Curriculum: Year 1

Minimum credits: 144

Fundamental modules

[Academic orientation 112](#) (UPO 112) - Credits: 0.00

Core modules

[General chemistry 171](#) (CHM 171) - Credits: 16.00

[Electricity and electronics 122](#) (EBN 122) - Credits: 16.00

[Physics 176](#) (FSK 176) - Credits: 16.00

[Humanities and social sciences 110](#) (HAS 110) - Credits: 8.00

[Humanities and social sciences 120](#) (HAS 120) - Credits: 8.00

[Graphical communication 110](#) (MGC 110) - Credits: 16.00

[Materials science 113](#) (NMC 113) - Credits: 16.00

[Mechanics 122](#) (SWK 122) - Credits: 16.00

[Workshop practice 121](#) (SWP 121) - Credits: 6.00

[Calculus 158](#) (WTW 158) - Credits: 16.00

[Mathematics 164](#) (WTW 164) - Credits: 16.00

Curriculum: Year 2

Minimum credits: 152

Core modules

[Engineering statistics 220](#) (BES 220) - Credits: 8.00

[Geology for engineering 256](#) (GLY 256) - Credits: 16.00

[Community-based project 203](#) (JCP 203) - Credits: 8.00

[Programming and information technology 213](#) (MPR 213) - Credits: 16.00

[Pavement materials and design 221](#) (SGM 221) - Credits: 16.00

[Structural analysis 223](#) (SIN 223) - Credits: 16.00

[Strength of materials 210](#) (SWK 210) - Credits: 16.00

[Strength of materials II 211](#) (SWK 211) - Credits: 16.00

[Mathematics 238](#) (WTW 238) - Credits: 16.00

[Differential equations 256](#) (WTW 256) - Credits: 8.00

[Calculus 258](#) (WTW 258) - Credits: 8.00

[Numerical methods 263](#) (WTW 263) - Credits: 8.00

Curriculum: Year 3

Minimum credits: 154

Core modules

Civil building materials 321 (SBM 321) - Credits: 16.00
Civil engineering measurement techniques 321 (SBZ 321) - Credits: 8.00
Soil mechanics 311 (SGM 311) - Credits: 16.00
Geotechnical engineering 323 (SGM 323) - Credits: 16.00
Hydraulics 310 (SHC 310) - Credits: 16.00
Hydraulics 321 (SHC 321) - Credits: 16.00
Timber design 310 (SIB 310) - Credits: 8.00
Civil engineering economics 310 (SIE 310) - Credits: 8.00
Structural analysis 311 (SIN 311) - Credits: 8.00
Steel design 323 (SIN 323) - Credits: 8.00
Reinforced concrete design 324 (SIN 324) - Credits: 8.00
Professional and technical communication 310 (SJJ 310) - Credits: 8.00
Transportation engineering 323 (SVC 323) - Credits: 16.00

Curriculum: Final year

Minimum credits: 158

Core modules

Engineering professionalism 410 (IPI 410) - Credits: 8.00
Civil engineering construction management 420 (SBZ 420) - Credits: 16.00
Computer applications in civil engineering 420 (SCA 420) - Credits: 16.00
Detailed design 420 (SDO 420) - Credits: 24.00
Civil environmental management 421 (SEV 421) - Credits: 16.00
Hydraulics 410 (SHC 410) - Credits: 16.00
Steel design 411 (SIN 411) - Credits: 8.00
Reinforced concrete design 413 (SIN 413) - Credits: 8.00
Practical training 410 (SPY 410) - Credits: 16.00
Research project 412 (SSC 412) - Credits: 30.00
Infrastructure planning 412 (SVC 412) - Credits: 16.00

BEng Civil Engineering ENGAGE (12136007)

Minimum duration of study 5 years

Programme information

Please note: The Engineering Augmented Degree Programme (ENGAGE) is an extended degree programme with a five-year curriculum. It is designed to enable students who show academic potential but who do not meet the normal entry requirements for the four-year degree programme, to obtain an Engineering degree. ENGAGE students spend the first three years of the programme covering the content of the first two years of the four-year degree programme. They also take compulsory augmented modules in each of the Level 1 subjects. These augmented modules provide students with background knowledge and skills needed to succeed in an engineering degree. The curriculum for years four and five of the ENGAGE programme are identical to the curriculum for years 3 and 4 of the 4-year programme, respectively. Students may apply directly for admission to

the programme.

- Students must register for the entire programme, not components of it. The curriculum is fixed; there are no electives.
- Attendance at all components of years 1 to 3 of the programme is compulsory. Non-attendance will only be condoned in the case of illness (sick note required) or family crisis (e.g. a death in the family), in which case students must inform the programme administration immediately.
- Students who fail to meet the attendance requirement for any module in any semester of years 1 to 3 of the programme will be excluded from the programme.
- No augmented module may be repeated more than once.
- Selection into the programme will be based on a combination of performance in the National Senior Certificate examinations or equivalent and other selection tests approved by the faculty.
- A student who fails a mainstream module (e.g. Chemistry) but passes the associated augmented module (e.g. Additional chemistry) does not need to repeat the augmented module.
- A student who fails an augmented module (e.g. Additional chemistry) but passes the associated mainstream module (e.g. Chemistry) does not need to repeat the mainstream module.
- A student must meet the attendance requirement and obtain at least 40% for both the continuous assessment and test components as well as a final mark of 50% in order to pass an augmented module.
- i. The curricula of the fourth and the fifth years of study are identical to those of the third and the fourth years of the four-year programme.
- ii. JPO 110 is a prerequisite for JPO 120. Credit for JPO is obtained with a final mark of more than 50%.
Conditional admission to JPO 120: If the final mark for JPO 110 is between 45% and 49%, a student can register for JPO 120 but credit for JPO 110 and JPO 120 will only be obtained if the final combined mark for JPO 110 and JPO 120 is above 50%.

Please note: All students will be required to successfully complete JCP 203, Community-based project 203, as part of the requirements for the BEng degree. A student may register for the module during any of the years of study of the programme, but preferably not during the first or the final year of study.

Learning outcomes of the BEng degree:

A graduate in engineering should be able to apply the following skills on an advanced level:

- a. Engineering problem solving.
- b. Application of specialist and fundamental knowledge, with specific reference to mathematics, basic sciences and engineering sciences.
- c. Engineering design and synthesis.
- d. Investigation, experimentation and data analysis.
- e. Engineering methods, skills, tools and information technology.
- f. Professional and general communication.
- g. Awareness and knowledge of the impact of engineering activity on society and the physical environment.
- h. Work in teams and in multidisciplinary environments.
- i. An awareness and ability for lifelong learning.
- j. An awareness and knowledge of principles of professional ethics and practice.
- k. Awareness and knowledge of engineering management principles and economic decision-making.

Learning contents of the BEng programmes:

Six essential knowledge areas are included in the syllabi of the programmes. The typical representation of each knowledge area as a percentage of the total contents of an undergraduate programme is given in brackets () in the list below. This percentage varies for the different study directions, but conforms in all instances to the

minimum knowledge area content as stipulated by ECSA.

Knowledge areas:

- a. Mathematics, including numerical methods and statistics (13%)
- b. Basic sciences: the natural sciences essential to the programme (15%)
- c. Engineering sciences (40%)
- d. Engineering design and synthesis (16%)
- e. Computing and information technology (5%)
- f. Complementary studies: communication, economy, management, innovation, environmental impact, ethics, engineering practice (11%).

Promotion to next study year

Promotion to the second semester of the first year and to the second year of study (Eng. 14)

- a. A new first-year student who has failed in all the prescribed modules of the programme at the end of the first semester, is excluded from studies in the School of Engineering. A student who is registered for the Engineering Augmented Degree Programme and has passed only 8 credits will also be excluded.
- b. A student who complies with all the requirements of the first year of study, is promoted to the second year of study.
- c. A student who has not passed at least 70% of the credits of the first year of study after the November examinations, must reapply for admission should he/she intend to proceed with his/her studies. Application on the prescribed form must be submitted to the Student Administration of the School of Engineering not later than 11 January. Late applications will be accepted only in exceptional circumstances after approval by the Dean. Should first-year students be readmitted, conditions of readmission will be determined by the Admissions Committee.
- d. Students who have not passed all the prescribed modules at first year level (level 100), as well as students who are readmitted in terms of Faculty Regulations must register for the outstanding first-year level (level-100) modules.
- e. A student who is repeating his or her first year, may, on recommendation of the relevant heads of department and with the approval of the Dean, be permitted to enroll for modules of the second-year of study in addition to the first-year modules which he or she failed, providing that he or she complies with the prerequisites for the second-year modules and no timetable clashes occur. Students on the ENGAGE programme may, following the same procedure, be permitted to enrol for level-200 modules in addition to the level-100 modules which he/she failed providing that he/she complies with the prerequisites for the modules at 200-level and no timetable clashes occur. On recommendation of the relevant head of department and with special permission from the Dean, permission may be granted to exceed the prescribed number of credits. The total number of credits which may be approved may not exceed the normal number of credits per semester by more than 16 credits.
- f. Students in Computer, Electrical and Electronic Engineering, who fail a first-year module for the second time, forfeit the privilege of registering for any modules of an advanced year of study.

Please note:

- i. From the second year of study each student should be in possession of an approved calculator. It is assumed that each student will have easy access to a laptop computer.
- ii. Students who intend transferring to Mining Engineering, must familiarise themselves with the stipulations set out in the syllabi of PWP 121 Workshop practice 121.

Promotion to the third year of study of the Four-year Programme, as well as to the third and the fourth years of study of the ENGAGE Programme. In case of the fourth year of study of the ENGAGE Programme, the words "first", "second" and "third" must be substituted with the words "second", "third" and "fourth" respectively. (Eng. 15)

- a. A student who complies with all the requirements of the second year of study, is promoted to the third year of study.
- b. A student must pass all the prescribed modules at first year level (level 100) before he or she is admitted to any module at third year level (level 300).
- c. A student who is repeating his or her second year must register for all the second-year modules still outstanding. Such a student may, on recommendation of the relevant head of department and with the approval of the Dean, be permitted to enroll for modules of the third year of study in addition to the second-year modules which he or she failed, providing that he or she complies with the prerequisites for the third-year modules and no timetable clashes occur. On recommendation of the relevant head of department, and with special permission from the Dean, permission may be granted to exceed the prescribed number of credits. The total number of credits which may be approved may not exceed the normal number of credits per semester by more than 16 credits.
- d. Students in Computer, Electrical and Electronic Engineering who fail a second-year module for the second time forfeit the privilege of registering for any modules of the third year of study.
- e. Students who intend transferring to Mining Engineering must familiarise themselves with the stipulations set out in the syllabi of PWP 120 Workshop practice 120, as well as PPY 317 Practical training 317.

Promotion to the fourth year of study of the Four-year Programme, as well as to the fifth year of study of the ENGAGE Programme. In case of the fifth year of study of the ENGAGE Programme, the words "second", "third" and "fourth" must be substituted with the words "third", "fourth" and "fifth" respectively. (Eng. 16)

- a. A student who complies with all the requirements of the third year of study is promoted to the fourth year of study. A student who does not comply with all the requirements but who is able to register for all outstanding modules in order to complete the degree programme, may at registration be promoted to the fourth year of study.
- b. A student must pass all the prescribed modules of the second year of study, before he or she is admitted to any module of the fourth year of study.
- c. A student who has not passed all the prescribed modules of the third year of study, must register for the outstanding modules. A student may be admitted by the Dean, on the recommendation of the relevant head of department, to modules of the fourth year of study, in addition to the outstanding third-year modules, provided that he or she complies with the prerequisites of the fourth-year modules and no timetable clashes occur. The total number of credits per semester for which a student registers may not exceed the normal number of credits per semester by more than 16 credits. In exceptional cases, the Dean may, on recommendation of the relevant head of department, permit a student to exceed the above limit.
- d. Students in Computer, Electrical and Electronic Engineering who fail a third-year module for the second time, forfeit the privilege of registering for any modules of the fourth year of study.

Pass with distinction

- a. A student graduates with distinction if:

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- i. no module of the third or fourth year of study of the four year programme or of the fourth or fifth year of the ENGAGE programme was repeated and a weighted average of at least 75% was obtained in one year in all the modules of the final year of study; and
 - ii. the degree programme was completed within the prescribed four years for the four year programme and within the prescribed five years of the ENGAGE programme.
- b. Exceptional cases to the above will be considered by the Dean.

Curriculum: Year 1

Minimum credits: 128

Fundamental modules

[Academic orientation 112](#) (UPO 112) - Credits: 0.00

Core modules

[General chemistry 171](#) (CHM 171) - Credits: 16.00

[Physics 176](#) (FSK 176) - Credits: 16.00

[Humanities and social sciences 110](#) (HAS 110) - Credits: 8.00

[Humanities and social sciences 120](#) (HAS 120) - Credits: 8.00

[Professional orientation 110](#) (JPO 110) - Credits: 8.00

[Additional Chemistry 1 111](#) (JPO 111) - Credits: 8.00

[Additional Mathematics 1 116](#) (JPO 116) - Credits: 8.00

[Professional orientation 120](#) (JPO 120) - Credits: 8.00

[Additional Physics 122](#) (JPO 122) - Credits: 8.00

[Additional Mathematics 2 126](#) (JPO 126) - Credits: 8.00

[Workshop practice 121](#) (SWP 121) - Credits: 6.00

[Calculus 158](#) (WTW 158) - Credits: 16.00

[Mathematics 164](#) (WTW 164) - Credits: 16.00

Curriculum: Year 2

Minimum credits: 120

Core modules

[Electricity and electronics 111](#) (EBN 111) - Credits: 16.00

[Community-based project 203](#) (JCP 203) - Credits: 8.00

[Additional Electricity and electronics 112](#) (JPO 112) - Credits: 8.00

[Additional Graphical communication 113](#) (JPO 113) - Credits: 8.00

[Additional Materials science 123](#) (JPO 123) - Credits: 8.00

[Additional Mechanics 125](#) (JPO 125) - Credits: 8.00

[Graphical communication 110](#) (MGC 110) - Credits: 16.00

[Materials science 123](#) (NMC 123) - Credits: 16.00

[Mechanics 122](#) (SWK 122) - Credits: 16.00

[Calculus 258](#) (WTW 258) - Credits: 8.00

[Numerical methods 263](#) (WTW 263) - Credits: 8.00

Curriculum: Year 3

Minimum credits: 128

Core modules

Engineering statistics 220 (BES 220) - Credits: 8.00
Geology for engineering 256 (GLY 256) - Credits: 16.00
Programming and information technology 213 (MPR 213) - Credits: 16.00
Pavement materials and design 221 (SGM 221) - Credits: 16.00
Structural analysis 223 (SIN 223) - Credits: 16.00
Strength of materials 210 (SWK 210) - Credits: 16.00
Strength of materials II 211 (SWK 211) - Credits: 16.00
Mathematics 238 (WTW 238) - Credits: 16.00
Differential equations 256 (WTW 256) - Credits: 8.00

Curriculum: Year 4

Minimum credits: 154

Core modules

Civil building materials 321 (SBM 321) - Credits: 16.00
Civil engineering measurement techniques 321 (SBZ 321) - Credits: 8.00
Soil mechanics 311 (SGM 311) - Credits: 16.00
Geotechnical engineering 323 (SGM 323) - Credits: 16.00
Hydraulics 310 (SHC 310) - Credits: 16.00
Hydraulics 321 (SHC 321) - Credits: 16.00
Timber design 310 (SIB 310) - Credits: 8.00
Civil engineering economics 310 (SIE 310) - Credits: 8.00
Structural analysis 311 (SIN 311) - Credits: 8.00
Steel design 323 (SIN 323) - Credits: 8.00
Reinforced concrete design 324 (SIN 324) - Credits: 8.00
Professional and technical communication 310 (SJJ 310) - Credits: 8.00
Transportation engineering 323 (SVC 323) - Credits: 16.00

Curriculum: Final year

Minimum credits: 158

Core modules

Engineering professionalism 410 (IPI 410) - Credits: 8.00
Civil engineering construction management 420 (SBZ 420) - Credits: 16.00
Computer applications in civil engineering 420 (SCA 420) - Credits: 16.00
Detailed design 420 (SDO 420) - Credits: 24.00
Civil environmental management 421 (SEV 421) - Credits: 16.00
Hydraulics 410 (SHC 410) - Credits: 16.00
Steel design 411 (SIN 411) - Credits: 8.00
Reinforced concrete design 413 (SIN 413) - Credits: 8.00
Practical training 410 (SPY 410) - Credits: 16.00
Research project 412 (SSC 412) - Credits: 30.00
Infrastructure planning 412 (SVC 412) - Credits: 16.00

BEng Computer Engineering (12130009)

Minimum duration of study 4 years

Programme information

All fields of study of the BEng degree have been accredited by the Engineering Council of South Africa (ECSA), and comply with the academic requirements for registration as a professional engineer. The programmes are designed in accordance with the outcomes-based model as required by the South African Qualifications Authority (SAQA). The learning outcomes and contents of the programmes have been compiled in accordance with the latest accreditation standards (PE-60 and PE-61) of ECSA, which also comply with the SAQA requirements, and which are summarised as follows:

Learning outcomes of the BEng degree:

A graduate in engineering should be able to apply the following skills on an advanced level:

- a. Engineering problem solving.
- b. Application of specialist and fundamental knowledge, with specific reference to mathematics, basic sciences and engineering sciences.
- c. Engineering design and synthesis.
- d. Investigation, experimentation and data analysis.
- e. Engineering methods, skills, tools and information technology.
- f. Professional and general communication.
- g. Awareness and knowledge of the impact of engineering activity on society and the physical environment.
- h. Work in teams and in multidisciplinary environments.
 - i. An awareness and ability for lifelong learning.
 - j. An awareness and knowledge of principles of professional ethics and practice.
- k. Awareness and knowledge of engineering management principles and economic decision-making.

Learning contents of the BEng programmes:

Six essential knowledge areas are included in the syllabi of the programmes. The typical representation of each knowledge area as a percentage of the total contents of an undergraduate programme is given in brackets () in the list below. This percentage varies for the different study directions, but conforms in all instances to the minimum knowledge area content as stipulated by ECSA.

Knowledge areas:

- a. Mathematics, including numerical methods and statistics (13%)
- b. Basic sciences: the natural sciences essential to the programme (15%)
- c. Engineering sciences (40%)
- d. Engineering design and synthesis (16%)
- e. Computing and information technology (5%)
- f. Complementary studies: communication, economy, management, innovation, environmental impact, ethics, engineering practice (11%).

Admission requirements

- The following persons will be considered for admission: candidates who are in possession of a certificate that is deemed by the University to be equivalent to the required Grade 12 certificate with university endorsement; candidates who are graduates from another tertiary institution or have been granted the status of a graduate of such an institution; and candidates who are graduates of another faculty at the University of Pretoria.
- Life Orientation is excluded when calculating the APS.
- Grade 11 results are used in the conditional admission of prospective students.
- A valid qualification with admission to degree studies is required.

- Minimum subject and achievement requirements, as set out below, are required.
- Conditional admission to the four-year programmes in the School of Engineering is only guaranteed if a prospective student complies with ALL the requirements below.
- **Note:** Candidates who do not comply with the minimum requirements, set out above, but who have obtained a minimum APS of 30, an achievement level of 5 for English, 6 for Mathematics and 5 for Physical Science, will be considered for conditional admission to either the four-year programme or the ENGAGE programme based on the results of the NBT.
- Admission to ENGAGE in the School of Engineering will be determined by the results of the NBT, NSC results, an achievement level of 5 in Mathematics and 5 in Physical Science, as well as an achievement level of 5 in English, together with an APS of 30.
- Students may apply directly to be considered for the ENGAGE programme.
- Tuition will be presented in English only.

Minimum requirements

Achievement level

English Home

Language or

English First

Additional

Language

		Mathematics		Physical Science		APS
NSC/IEB	AS Level	NSC/IEB	AS Level	NSC/IEB	AS Level	
5	C	6	B	6	B	35

* Cambridge A level candidates who obtained at least a D in the required subjects, will be considered for admission. International Baccalaureate (IB) HL candidates who obtained at least a 4 in the required subjects, will be considered for admission.

ENGAGE Programme minimum requirements

Achievement level

English Home

Language or

English First

Additional

Language

		Mathematics		Physical Science		APS
NSC/IEB	AS Level	NSC/IEB	AS Level	NSC/IEB	AS Level	
5	C	5	C	5	C	30

Other programme-specific information

With a few exceptions, most modules offered at the School of Engineering are semester modules having credit values of either 8 or 16.

A student may be permitted by the Dean, on recommendation of the relevant head of department, to register for an equivalent module in an alternate semester, although the module is normally offered to the student's group in another semester, and providing that no timetable clashes occur.

Please note:

1. All students are required to successfully complete JCP 203, Community-based project 203, as part of the requirements for the BEng degree. A student may register for the module during any of the years of study of the programme, but preferably not during the first or the final year of study.

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2. Students registered for Chemical Engineering who have passed CBI 311 or CBI 410, receive credit for CBI 310.
 3. Mechanical Engineering: For the Aeronautical Option, the themes of both the Design and the Project must be aeronautical-related.
 4. Offering of electives depends on the availability of resources and industry support.

Promotion to next study year

Promotion to the second semester of the first year and to the second year of study (Eng. 14)

- a. A new first-year student who has failed in all the prescribed modules of the programme at the end of the first semester, is excluded from studies in the School of Engineering. A student who is registered for the Engineering Augmented Degree Programme and has passed only 8 credits will also be excluded.
- b. A student who complies with all the requirements of the first year of study, is promoted to the second year of study.
- c. A student who has not passed at least 70% of the credits of the first year of study after the November examinations, must reapply for admission should he/she intend to proceed with his/her studies. Application on the prescribed form must be submitted to the Student Administration of the School of Engineering not later than 11 January. Late applications will be accepted only in exceptional circumstances after approval by the Dean. Should first-year students be readmitted, conditions of readmission will be determined by the Admissions Committee.
- d. Students who have not passed all the prescribed modules at first year level (level 100), as well as students who are readmitted in terms of Faculty Regulations must register for the outstanding first-year level (level-100) modules.
- e. A student who is repeating his or her first year, may, on recommendation of the relevant heads of department and with the approval of the Dean, be permitted to enroll for modules of the second-year of study in addition to the first-year modules which he or she failed, providing that he or she complies with the prerequisites for the second-year modules and no timetable clashes occur. Students on the ENGAGE programme may, following the same procedure, be permitted to enrol for level-200 modules in addition to the level-100 modules which he/she failed providing that he/she complies with the prerequisites for the modules at 200-level and no timetable clashes occur. On recommendation of the relevant head of department and with special permission from the Dean, permission may be granted to exceed the prescribed number of credits. The total number of credits which may be approved may not exceed the normal number of credits per semester by more than 16 credits.
- f. Students in Computer, Electrical and Electronic Engineering, who fail a first-year module for the second time, forfeit the privilege of registering for any modules of an advanced year of study.

Please note:

- i. From the second year of study each student should be in possession of an approved calculator. It is assumed that each student will have easy access to a laptop computer.
- ii. Students who intend transferring to Mining Engineering, must familiarise themselves with the stipulations set out in the syllabi of PWP 121 Workshop practice 121.

Promotion to the third year of study of the Four-year Programme, as well as to the third and the fourth years of study of the ENGAGE Programme. In case of the fourth year of study of the ENGAGE Programme, the words "first", "second" and "third" must be substituted with the words "second", "third" and "fourth" respectively. (Eng. 15)

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- a. A student who complies with all the requirements of the second year of study, is promoted to the third year of study.
 - b. A student must pass all the prescribed modules at first year level (level 100) before he or she is admitted to any module at third year level (level 300).
 - c. A student who is repeating his or her second year must register for all the second-year modules still outstanding. Such a student may, on recommendation of the relevant head of department and with the approval of the Dean, be permitted to enroll for modules of the third year of study in addition to the second-year modules which he or she failed, providing that he or she complies with the prerequisites for the third-year modules and no timetable clashes occur. On recommendation of the relevant head of department, and with special permission from the Dean, permission may be granted to exceed the prescribed number of credits. The total number of credits which may be approved may not exceed the normal number of credits per semester by more than 16 credits.
 - d. Students in Computer, Electrical and Electronic Engineering who fail a second-year module for the second time forfeit the privilege of registering for any modules of the third year of study.
 - e. Students who intend transferring to Mining Engineering must familiarise themselves with the stipulations set out in the syllabi of PWP 120 Workshop practice 120, as well as PPY 317 Practical training 317.

Promotion to the fourth year of study of the Four-year Programme, as well as to the fifth year of study of the ENGAGE Programme. In case of the fifth year of study of the ENGAGE Programme, the words "second", "third" and "fourth" must be substituted with the words "third", "fourth" and "fifth" respectively. (Eng. 16)

- a. A student who complies with all the requirements of the third year of study is promoted to the fourth year of study. A student who does not comply with all the requirements but who is able to register for all outstanding modules in order to complete the degree programme, may at registration be promoted to the fourth year of study.
- b. A student must pass all the prescribed modules of the second year of study, before he or she is admitted to any module of the fourth year of study.
- c. A student who has not passed all the prescribed modules of the third year of study, must register for the outstanding modules. A student may be admitted by the Dean, on the recommendation of the relevant head of department, to modules of the fourth year of study, in addition to the outstanding third-year modules, provided that he or she complies with the prerequisites of the fourth-year modules and no timetable clashes occur. The total number of credits per semester for which a student registers may not exceed the normal number of credits per semester by more than 16 credits. In exceptional cases, the Dean may, on recommendation of the relevant head of department, permit a student to exceed the above limit.
- d. Students in Computer, Electrical and Electronic Engineering who fail a third-year module for the second time, forfeit the privilege of registering for any modules of the fourth year of study.

Pass with distinction

- a. A student graduates with distinction if:
 - i. no module of the third or fourth year of study of the four year programme or of the fourth or fifth year of the ENGAGE programme was repeated and a weighted average of at least 75% was obtained in one year in all the modules of the final year of study; and
 - ii. the degree programme was completed within the prescribed four years for the four year programme and within the prescribed five years of the ENGAGE programme.

b. Exceptional cases to the above will be considered by the Dean.

Curriculum: Year 1

Minimum credits: 144

Please Note: Cos 222 has been replaced by Cos122 as from 2017 academic year. Students who have already passed Cos 222 will be credited for Cos 122.

Fundamental modules

[Academic orientation 112](#) (UPO 112) - Credits: 0.00

Core modules

[Program design: Introduction 110](#) (COS 110) - Credits: 16.00

[Operating systems 122](#) (COS 122) - Credits: 16.00

[Imperative programming 132](#) (COS 132) - Credits: 16.00

[Electricity and electronics 111](#) (EBN 111) - Credits: 16.00

[Information technology practice 121](#) (EIW 121) - Credits: 8.00

[Physics 116](#) (FSK 116) - Credits: 16.00

[Humanities and social sciences 110](#) (HAS 110) - Credits: 8.00

[Humanities and social sciences 120](#) (HAS 120) - Credits: 8.00

[Mechanics 122](#) (SWK 122) - Credits: 16.00

[Calculus 158](#) (WTW 158) - Credits: 16.00

[Mathematics 164](#) (WTW 164) - Credits: 16.00

Curriculum: Year 2

Minimum credits: 156

Core modules

[Engineering statistics 220](#) (BES 220) - Credits: 8.00

[Data structures and algorithms 212](#) (COS 212) - Credits: 16.00

[Electrical engineering 211](#) (EIR 211) - Credits: 16.00

[Information technology practice 221](#) (EIW 221) - Credits: 8.00

[Professional and technical communication 210](#) (EJJ 210) - Credits: 8.00

[Linear systems 220](#) (ELI 220) - Credits: 16.00

[Introduction to programming and computer simulations 101](#) (EMR 101) - Credits: 4.00

[Digital systems 220](#) (ERS 220) - Credits: 16.00

[Community-based project 203](#) (JCP 203) - Credits: 8.00

[Materials science 113](#) (NMC 113) - Credits: 16.00

[Mathematics 238](#) (WTW 238) - Credits: 16.00

[Differential equations 256](#) (WTW 256) - Credits: 8.00

[Calculus 258](#) (WTW 258) - Credits: 8.00

[Numerical methods 263](#) (WTW 263) - Credits: 8.00

Curriculum: Year 3

Minimum credits: 152

Core modules

[Engineering management 310](#) (BSS 310) - Credits: 8.00

Intelligent systems 320 (EAI 320) - Credits: 16.00
Control systems 320 (EBB 320) - Credits: 16.00
Digital communication 310 (EDC 310) - Credits: 16.00
Information technology practice 320 (EIW 320) - Credits: 8.00
Electromagnetic compatibility 310 (EME 310) - Credits: 16.00
Microprocessors 310 (EMK 310) - Credits: 16.00
Analogue electronics 310 (ENE 310) - Credits: 16.00
Software engineering 321 (EPE 321) - Credits: 16.00
Computer engineering design 320 (ERD 320) - Credits: 16.00
Engineering activity and group work 320 (MIA 320) - Credits: 8.00

Curriculum: Final year

Minimum credits: 152

Core modules

Computer engineering: Architecture and systems 410 (EAS 410) - Credits: 16.00
e-Business and network security 410 (EHN 410) - Credits: 16.00
Project 402 (EPR 402) - Credits: 64.00
Practical training and report 423 (EPY 423) - Credits: 16.00
Research project 420 (ERP 420) - Credits: 16.00
DSP programming and application 411 (ESP 411) - Credits: 16.00
Engineering professionalism 410 (IPI 410) - Credits: 8.00

BEng Computer Engineering ENGAGE (12136009)

Minimum duration of study 5 years

Programme information

Please note: The Engineering Augmented Degree Programme (ENGAGE) is an extended degree programme with a five-year curriculum. It is designed to enable students who show academic potential but who do not meet the normal entry requirements for the four-year degree programme, to obtain an Engineering degree. ENGAGE students spend the first three years of the programme covering the content of the first two years of the four-year degree programme. They also take compulsory augmented modules in each of the Level 1 subjects. These augmented modules provide students with background knowledge and skills needed to succeed in an engineering degree. The curriculum for years four and five of the ENGAGE programme are identical to the curriculum for years 3 and 4 of the 4-year programme, respectively. Students may apply directly for admission to the programme.

- Students must register for the entire programme, not components of it. The curriculum is fixed; there are no electives.
- Attendance at all components of years 1 to 3 of the programme is compulsory. Non-attendance will only be condoned in the case of illness (sick note required) or family crisis (e.g. a death in the family), in which case students must inform the programme administration immediately.
- Students who fail to meet the attendance requirement for any module in any semester of years 1 to 3 of the programme will be excluded from the programme.
- No augmented module may be repeated more than once.
- Selection into the programme will be based on a combination of performance in the National Senior Certificate examinations or equivalent and other selection tests approved by the faculty.

- A student who fails a mainstream module (e.g. Chemistry) but passes the associated augmented module (e.g. Additional chemistry) does not need to repeat the augmented module.
 - A student who fails an augmented module (e.g. Additional chemistry) but passes the associated mainstream module (e.g. Chemistry) does not need to repeat the mainstream module.
 - A student must meet the attendance requirement and obtain at least 40% for both the continuous assessment and test components as well as a final mark of 50% in order to pass an augmented module.
- i. The curricula of the fourth and the fifth years of study are identical to those of the third and the fourth years of the four-year programme.
 - ii. JPO 110 is a prerequisite for JPO 120. Credit for JPO is obtained with a final mark of more than 50%.
Conditional admission to JPO 120: If the final mark for JPO 110 is between 45% and 49%, a student can register for JPO 120 but credit for JPO 110 and JPO 120 will only be obtained if the final combined mark for JPO 110 and JPO 120 is above 50%.

Please note: All students will be required to successfully complete JCP 203, Community-based project 203, as part of the requirements for the BEng degree. A student may register for the module during any of the years of study of the programme, but preferably not during the first or the final year of study.

Learning outcomes of the BEng degree:

A graduate in engineering should be able to apply the following skills on an advanced level:

- a. Engineering problem solving.
- b. Application of specialist and fundamental knowledge, with specific reference to mathematics, basic sciences and engineering sciences.
- c. Engineering design and synthesis.
- d. Investigation, experimentation and data analysis.
- e. Engineering methods, skills, tools and information technology.
- f. Professional and general communication.
- g. Awareness and knowledge of the impact of engineering activity on society and the physical environment.
- h. Work in teams and in multidisciplinary environments.
- i. An awareness and ability for lifelong learning.
- j. An awareness and knowledge of principles of professional ethics and practice.
- k. Awareness and knowledge of engineering management principles and economic decision-making.

Learning contents of the BEng programmes:

Six essential knowledge areas are included in the syllabi of the programmes. The typical representation of each knowledge area as a percentage of the total contents of an undergraduate programme is given in brackets () in the list below. This percentage varies for the different study directions, but conforms in all instances to the minimum knowledge area content as stipulated by ECSA.

Knowledge areas:

- a. Mathematics, including numerical methods and statistics (13%)
- b. Basic sciences: the natural sciences essential to the programme (15%)
- c. Engineering sciences (40%)
- d. Engineering design and synthesis (16%)
- e. Computing and information technology (5%)
- f. Complementary studies: communication, economy, management, innovation, environmental impact, ethics, engineering practice (11%).

Promotion to next study year

Promotion to the second semester of the first year and to the second year of study (Eng. 14)

- a. A new first-year student who has failed in all the prescribed modules of the programme at the end of the first semester, is excluded from studies in the School of Engineering. A student who is registered for the Engineering Augmented Degree Programme and has passed only 8 credits will also be excluded.
- b. A student who complies with all the requirements of the first year of study, is promoted to the second year of study.
- c. A student who has not passed at least 70% of the credits of the first year of study after the November examinations, must reapply for admission should he/she intend to proceed with his/her studies. Application on the prescribed form must be submitted to the Student Administration of the School of Engineering not later than 11 January. Late applications will be accepted only in exceptional circumstances after approval by the Dean. Should first-year students be readmitted, conditions of readmission will be determined by the Admissions Committee.
- d. Students who have not passed all the prescribed modules at first year level (level 100), as well as students who are readmitted in terms of Faculty Regulations must register for the outstanding first-year level (level-100) modules.
- e. A student who is repeating his or her first year, may, on recommendation of the relevant heads of department and with the approval of the Dean, be permitted to enroll for modules of the second-year of study in addition to the first-year modules which he or she failed, providing that he or she complies with the prerequisites for the second-year modules and no timetable clashes occur. Students on the ENGAGE programme may, following the same procedure, be permitted to enrol for level-200 modules in addition to the level-100 modules which he/she failed providing that he/she complies with the prerequisites for the modules at 200-level and no timetable clashes occur. On recommendation of the relevant head of department and with special permission from the Dean, permission may be granted to exceed the prescribed number of credits. The total number of credits which may be approved may not exceed the normal number of credits per semester by more than 16 credits.
- f. Students in Computer, Electrical and Electronic Engineering, who fail a first-year module for the second time, forfeit the privilege of registering for any modules of an advanced year of study.

Please note:

- i. From the second year of study each student should be in possession of an approved calculator. It is assumed that each student will have easy access to a laptop computer.
- ii. Students who intend transferring to Mining Engineering, must familiarise themselves with the stipulations set out in the syllabi of PWP 121 Workshop practice 121.

Promotion to the third year of study of the Four-year Programme, as well as to the third and the fourth years of study of the ENGAGE Programme. In case of the fourth year of study of the ENGAGE Programme, the words "first", "second" and "third" must be substituted with the words "second", "third" and "fourth" respectively. (Eng. 15)

- a. A student who complies with all the requirements of the second year of study, is promoted to the third year of study.
- b. A student must pass all the prescribed modules at first year level (level 100) before he or she is admitted to any module at third year level (level 300).
- c. A student who is repeating his or her second year must register for all the second-year modules still

outstanding. Such a student may, on recommendation of the relevant head of department and with the approval of the Dean, be permitted to enroll for modules of the third year of study in addition to the second-year modules which he or she failed, providing that he or she complies with the prerequisites for the third-year modules and no timetable clashes occur. On recommendation of the relevant head of department, and with special permission from the Dean, permission may be granted to exceed the prescribed number of credits. The total number of credits which may be approved may not exceed the normal number of credits per semester by more than 16 credits.

- d. Students in Computer, Electrical and Electronic Engineering who fail a second-year module for the second time forfeit the privilege of registering for any modules of the third year of study.
- e. Students who intend transferring to Mining Engineering must familiarise themselves with the stipulations set out in the syllabi of PWP 120 Workshop practice 120, as well as PPY 317 Practical training 317.

Promotion to the fourth year of study of the Four-year Programme, as well as to the fifth year of study of the ENGAGE Programme. In case of the fifth year of study of the ENGAGE Programme, the words "second", "third" and "fourth" must be substituted with the words "third", "fourth" and "fifth" respectively. (Eng. 16)

- a. A student who complies with all the requirements of the third year of study is promoted to the fourth year of study. A student who does not comply with all the requirements but who is able to register for all outstanding modules in order to complete the degree programme, may at registration be promoted to the fourth year of study.
- b. A student must pass all the prescribed modules of the second year of study, before he or she is admitted to any module of the fourth year of study.
- c. A student who has not passed all the prescribed modules of the third year of study, must register for the outstanding modules. A student may be admitted by the Dean, on the recommendation of the relevant head of department, to modules of the fourth year of study, in addition to the outstanding third-year modules, provided that he or she complies with the prerequisites of the fourth-year modules and no timetable clashes occur. The total number of credits per semester for which a student registers may not exceed the normal number of credits per semester by more than 16 credits. In exceptional cases, the Dean may, on recommendation of the relevant head of department, permit a student to exceed the above limit.
- d. Students in Computer, Electrical and Electronic Engineering who fail a third-year module for the second time, forfeit the privilege of registering for any modules of the fourth year of study.

Pass with distinction

- a. A student graduates with distinction if:
 - i. no module of the third or fourth year of study of the four year programme or of the fourth or fifth year of the ENGAGE programme was repeated and a weighted average of at least 75% was obtained in one year in all the modules of the final year of study; and
 - ii. the degree programme was completed within the prescribed four years for the four year programme and within the prescribed five years of the ENGAGE programme.
- b. Exceptional cases to the above will be considered by the Dean.

Curriculum: Year 1

Minimum credits: 128

Please Note: Cos 222 has been replaced by Cos122 as from 2017 academic year. Students who have already passed Cos 222 will be credited for Cos 122.

Fundamental modules

[Academic orientation 112](#) (UPO 112) - Credits: 0.00

Core modules

[Information technology practice 121](#) (EIW 121) - Credits: 8.00

[Physics 116](#) (FSK 116) - Credits: 16.00

[Humanities and social sciences 110](#) (HAS 110) - Credits: 8.00

[Humanities and social sciences 120](#) (HAS 120) - Credits: 8.00

[Professional orientation 110](#) (JPO 110) - Credits: 8.00

[Additional Mathematics 1 116](#) (JPO 116) - Credits: 8.00

[Professional orientation 120](#) (JPO 120) - Credits: 8.00

[Additional Mechanics 125](#) (JPO 125) - Credits: 8.00

[Additional Mathematics 2 126](#) (JPO 126) - Credits: 8.00

[Additional Physics 152](#) (JPO 152) - Credits: 8.00

[Mechanics 122](#) (SWK 122) - Credits: 16.00

[Calculus 158](#) (WTW 158) - Credits: 16.00

[Mathematics 164](#) (WTW 164) - Credits: 16.00

Curriculum: Year 2

Minimum credits: 120

Core modules

[Program design: Introduction 110](#) (COS 110) - Credits: 16.00

[Imperative programming 132](#) (COS 132) - Credits: 16.00

[Electricity and electronics 111](#) (EBN 111) - Credits: 16.00

[Information technology practice 221](#) (EIW 221) - Credits: 8.00

[Additional Electricity and electronics 112](#) (JPO 112) - Credits: 8.00

[Additional Programming 1 114](#) (JPO 114) - Credits: 8.00

[Additional Materials science 123](#) (JPO 123) - Credits: 8.00

[Additional Programming 2 124](#) (JPO 124) - Credits: 8.00

[Materials science 123](#) (NMC 123) - Credits: 16.00

[Calculus 258](#) (WTW 258) - Credits: 8.00

[Numerical methods 263](#) (WTW 263) - Credits: 8.00

Curriculum: Year 3

Minimum credits: 132

Core modules

[Engineering statistics 220](#) (BES 220) - Credits: 8.00

[Operating systems 122](#) (COS 122) - Credits: 16.00

[Data structures and algorithms 212](#) (COS 212) - Credits: 16.00

[Electrical engineering 211](#) (EIR 211) - Credits: 16.00

[Professional and technical communication 210](#) (EJJ 210) - Credits: 8.00

[Linear systems 220](#) (ELI 220) - Credits: 16.00

[Introduction to programming and computer simulations 101](#) (EMR 101) - Credits: 4.00

Digital systems 220 (ERS 220) - Credits: 16.00
Community-based project 203 (JCP 203) - Credits: 8.00
Mathematics 238 (WTW 238) - Credits: 16.00
Differential equations 256 (WTW 256) - Credits: 8.00

Curriculum: Year 4

Minimum credits: 152

Core modules

Engineering management 310 (BSS 310) - Credits: 8.00
Intelligent systems 320 (EAI 320) - Credits: 16.00
Control systems 320 (EBB 320) - Credits: 16.00
Digital communication 310 (EDC 310) - Credits: 16.00
Information technology practice 320 (EIW 320) - Credits: 8.00
Electromagnetic compatibility 310 (EME 310) - Credits: 16.00
Microprocessors 310 (EMK 310) - Credits: 16.00
Analogue electronics 310 (ENE 310) - Credits: 16.00
Software engineering 321 (EPE 321) - Credits: 16.00
Computer engineering design 320 (ERD 320) - Credits: 16.00
Engineering activity and group work 320 (MIA 320) - Credits: 8.00

Curriculum: Final year

Minimum credits: 152

Core modules

Computer engineering: Architecture and systems 410 (EAS 410) - Credits: 16.00
e-Business and network security 410 (EHN 410) - Credits: 16.00
Project 402 (EPR 402) - Credits: 64.00
Practical training and report 423 (EPY 423) - Credits: 16.00
Research project 420 (ERP 420) - Credits: 16.00
DSP programming and application 411 (ESP 411) - Credits: 16.00
Engineering professionalism 410 (IPI 410) - Credits: 8.00

BEng Electrical Engineering (12130003)

Minimum duration of study 4 years

Programme information

All fields of study of the BEng degree have been accredited by the Engineering Council of South Africa (ECSA), and comply with the academic requirements for registration as a professional engineer. The programmes are designed in accordance with the outcomes-based model as required by the South African Qualifications Authority (SAQA). The learning outcomes and contents of the programmes have been compiled in accordance with the latest accreditation standards (PE-60 and PE-61) of ECSA, which also comply with the SAQA requirements, and which are summarised as follows:

Learning outcomes of the BEng degree:

A graduate in engineering should be able to apply the following skills on an advanced level:

-
- a. Engineering problem solving.
 - b. Application of specialist and fundamental knowledge, with specific reference to mathematics, basic sciences and engineering sciences.
 - c. Engineering design and synthesis.
 - d. Investigation, experimentation and data analysis.
 - e. Engineering methods, skills, tools and information technology.
 - f. Professional and general communication.
 - g. Awareness and knowledge of the impact of engineering activity on society and the physical environment.
 - h. Work in teams and in multidisciplinary environments.
 - i. An awareness and ability for lifelong learning.
 - j. An awareness and knowledge of principles of professional ethics and practice.
 - k. Awareness and knowledge of engineering management principles and economic decision-making.

Learning contents of the BEng programmes:

Six essential knowledge areas are included in the syllabi of the programmes. The typical representation of each knowledge area as a percentage of the total contents of an undergraduate programme is given in brackets () in the list below. This percentage varies for the different study directions, but conforms in all instances to the minimum knowledge area content as stipulated by ECSA.

Knowledge areas:

- a. Mathematics, including numerical methods and statistics (13%)
- b. Basic sciences: the natural sciences essential to the programme (15%)
- c. Engineering sciences (40%)
- d. Engineering design and synthesis (16%)
- e. Computing and information technology (5%)
- f. Complementary studies: communication, economy, management, innovation, environmental impact, ethics, engineering practice (11%).

Admission requirements

- The following persons will be considered for admission: candidates who are in possession of a certificate that is deemed by the University to be equivalent to the required Grade 12 certificate with university endorsement; candidates who are graduates from another tertiary institution or have been granted the status of a graduate of such an institution; and candidates who are graduates of another faculty at the University of Pretoria.
- Life Orientation is excluded when calculating the APS.
- Grade 11 results are used in the conditional admission of prospective students.
- A valid qualification with admission to degree studies is required.
- Minimum subject and achievement requirements, as set out below, are required.
- Conditional admission to the four-year programmes in the School of Engineering is only guaranteed if a prospective student complies with ALL the requirements below.
- **Note:** Candidates who do not comply with the minimum requirements, set out above, but who have obtained a minimum APS of 30, an achievement level of 5 for English, 6 for Mathematics and 5 for Physical Science, will be considered for conditional admission to either the four-year programme or the ENGAGE programme based on the results of the NBT.
- Admission to ENGAGE in the School of Engineering will be determined by the results of the NBT, NSC results, an achievement level of 5 in Mathematics and 5 in Physical Science, as well as an achievement level of 5 in English, together with an APS of 30.
- Students may apply directly to be considered for the ENGAGE programme.

- Tuition will be presented in English only.

Minimum requirements

Achievement level

English Home

Language or

English First

Additional

Language

		Mathematics		Physical Science		APS
NSC/IEB	AS Level	NSC/IEB	AS Level	NSC/IEB	AS Level	
5	C	6	B	6	B	35

* Cambridge A level candidates who obtained at least a D in the required subjects, will be considered for admission. International Baccalaureate (IB) HL candidates who obtained at least a 4 in the required subjects, will be considered for admission.

ENGAGE Programme minimum requirements

Achievement level

English Home

Language or

English First

Additional

Language

		Mathematics		Physical Science		APS
NSC/IEB	AS Level	NSC/IEB	AS Level	NSC/IEB	AS Level	
5	C	5	C	5	C	30

Other programme-specific information

With a few exceptions, most modules offered at the School of Engineering are semester modules having credit values of either 8 or 16.

A student may be permitted by the Dean, on recommendation of the relevant head of department, to register for an equivalent module in an alternate semester, although the module is normally offered to the student's group in another semester, and providing that no timetable clashes occur.

Please note:

1. All students are required to successfully complete JCP 203, Community-based project 203, as part of the requirements for the BEng degree. A student may register for the module during any of the years of study of the programme, but preferably not during the first or the final year of study.
2. Students registered for Chemical Engineering who have passed CBI 311 or CBI 410, receive credit for CBI 310.
3. Mechanical Engineering: For the Aeronautical Option, the themes of both the Design and the Project must be aeronautical-related.
4. Offering of electives depends on the availability of resources and industry support.

Promotion to next study year

Promotion to the second semester of the first year and to the second year of study (Eng. 14)

- a. A new first-year student who has failed in all the prescribed modules of the programme at the end of the first semester, is excluded from studies in the School of Engineering. A student who is registered for the Engineering Augmented Degree Programme and has passed only 8 credits will also be excluded.

-
- b. A student who complies with all the requirements of the first year of study, is promoted to the second year of study.
 - c. A student who has not passed at least 70% of the credits of the first year of study after the November examinations, must reapply for admission should he/she intend to proceed with his/her studies. Application on the prescribed form must be submitted to the Student Administration of the School of Engineering not later than 11 January. Late applications will be accepted only in exceptional circumstances after approval by the Dean. Should first-year students be readmitted, conditions of readmission will be determined by the Admissions Committee.
 - d. Students who have not passed all the prescribed modules at first year level (level 100), as well as students who are readmitted in terms of Faculty Regulations must register for the outstanding first-year level (level-100) modules.
 - e. A student who is repeating his or her first year, may, on recommendation of the relevant heads of department and with the approval of the Dean, be permitted to enroll for modules of the second-year of study in addition to the first-year modules which he or she failed, providing that he or she complies with the prerequisites for the second-year modules and no timetable clashes occur. Students on the ENGAGE programme may, following the same procedure, be permitted to enrol for level-200 modules in addition to the level-100 modules which he/she failed providing that he/she complies with the prerequisites for the modules at 200-level and no timetable clashes occur. On recommendation of the relevant head of department and with special permission from the Dean, permission may be granted to exceed the prescribed number of credits. The total number of credits which may be approved may not exceed the normal number of credits per semester by more than 16 credits.
 - f. Students in Computer, Electrical and Electronic Engineering, who fail a first-year module for the second time, forfeit the privilege of registering for any modules of an advanced year of study.

Please note:

- i. From the second year of study each student should be in possession of an approved calculator. It is assumed that each student will have easy access to a laptop computer.
- ii. Students who intend transferring to Mining Engineering, must familiarise themselves with the stipulations set out in the syllabi of PWP 121 Workshop practice 121.

Promotion to the third year of study of the Four-year Programme, as well as to the third and the fourth years of study of the ENGAGE Programme. In case of the fourth year of study of the ENGAGE Programme, the words "first", "second" and "third" must be substituted with the words "second", "third" and "fourth" respectively. (Eng. 15)

- a. A student who complies with all the requirements of the second year of study, is promoted to the third year of study.
- b. A student must pass all the prescribed modules at first year level (level 100) before he or she is admitted to any module at third year level (level 300).
- c. A student who is repeating his or her second year must register for all the second-year modules still outstanding. Such a student may, on recommendation of the relevant head of department and with the approval of the Dean, be permitted to enroll for modules of the third year of study in addition to the second-year modules which he or she failed, providing that he or she complies with the prerequisites for the third-year modules and no timetable clashes occur. On recommendation of the relevant head of department, and with special permission from the Dean, permission may be granted to exceed the prescribed number of

credits. The total number of credits which may be approved may not exceed the normal number of credits per semester by more than 16 credits.

- d. Students in Computer, Electrical and Electronic Engineering who fail a second-year module for the second time forfeit the privilege of registering for any modules of the third year of study.
- e. Students who intend transferring to Mining Engineering must familiarise themselves with the stipulations set out in the syllabi of PWP 120 Workshop practice 120, as well as PPY 317 Practical training 317.

Promotion to the fourth year of study of the Four-year Programme, as well as to the fifth year of study of the ENGAGE Programme. In case of the fifth year of study of the ENGAGE Programme, the words "second", "third" and "fourth" must be substituted with the words "third", "fourth" and "fifth" respectively. (Eng. 16)

- a. A student who complies with all the requirements of the third year of study is promoted to the fourth year of study. A student who does not comply with all the requirements but who is able to register for all outstanding modules in order to complete the degree programme, may at registration be promoted to the fourth year of study.
- b. A student must pass all the prescribed modules of the second year of study, before he or she is admitted to any module of the fourth year of study.
- c. A student who has not passed all the prescribed modules of the third year of study, must register for the outstanding modules. A student may be admitted by the Dean, on the recommendation of the relevant head of department, to modules of the fourth year of study, in addition to the outstanding third-year modules, provided that he or she complies with the prerequisites of the fourth-year modules and no timetable clashes occur. The total number of credits per semester for which a student registers may not exceed the normal number of credits per semester by more than 16 credits. In exceptional cases, the Dean may, on recommendation of the relevant head of department, permit a student to exceed the above limit.
- d. Students in Computer, Electrical and Electronic Engineering who fail a third-year module for the second time, forfeit the privilege of registering for any modules of the fourth year of study.

Pass with distinction

- a. A student graduates with distinction if:
 - i. no module of the third or fourth year of study of the four year programme or of the fourth or fifth year of the ENGAGE programme was repeated and a weighted average of at least 75% was obtained in one year in all the modules of the final year of study; and
 - ii. the degree programme was completed within the prescribed four years for the four year programme and within the prescribed five years of the ENGAGE programme.
- b. Exceptional cases to the above will be considered by the Dean.

Curriculum: Year 1

Minimum credits: 144

Fundamental modules

Academic orientation 112 (UPO 112) - Credits: 0.00

Core modules

General chemistry 171 (CHM 171) - Credits: 16.00
Electricity and electronics 122 (EBN 122) - Credits: 16.00
Physics 176 (FSK 176) - Credits: 16.00
Humanities and social sciences 110 (HAS 110) - Credits: 8.00
Humanities and social sciences 120 (HAS 120) - Credits: 8.00
Graphical communication 110 (MGC 110) - Credits: 16.00
Materials science 113 (NMC 113) - Credits: 16.00
Mechanics 122 (SWK 122) - Credits: 16.00
Calculus 158 (WTW 158) - Credits: 16.00
Mathematics 164 (WTW 164) - Credits: 16.00

Curriculum: Year 2

Minimum credits: 148

Core modules

Engineering statistics 220 (BES 220) - Credits: 8.00
Imperative programming 132 (COS 132) - Credits: 16.00
Electrical engineering 211 (EIR 211) - Credits: 16.00
Professional and technical communication 210 (EJJ 210) - Credits: 8.00
Linear systems 220 (ELI 220) - Credits: 16.00
Introduction to programming and computer simulations 101 (EMR 101) - Credits: 4.00
Practical wiring 200 (EPW 200) - Credits: 4.00
Digital systems 220 (ERS 220) - Credits: 16.00
Community-based project 203 (JCP 203) - Credits: 8.00
Dynamics 210 (MSD 210) - Credits: 16.00
Mathematics 238 (WTW 238) - Credits: 16.00
Differential equations 256 (WTW 256) - Credits: 8.00
Calculus 258 (WTW 258) - Credits: 8.00
Numerical methods 263 (WTW 263) - Credits: 8.00

Curriculum: Year 3

Minimum credits: 148

Core modules

Engineering management 310 (BSS 310) - Credits: 8.00
Control systems 320 (EBB 320) - Credits: 16.00
Power electronics 320 (EDF 320) - Credits: 16.00
Power system components 320 (EKK 320) - Credits: 16.00
Electrical machines 311 (ELX 311) - Credits: 16.00
Microprocessors 310 (EMK 310) - Credits: 16.00
Electromagnetism 310 (EMZ 310) - Credits: 16.00
Analogue electronics 310 (ENE 310) - Credits: 16.00
DSP programming 300 (ESP 300) - Credits: 4.00
Electrical engineering design 320 (EWE 320) - Credits: 16.00
Engineering activity and group work 320 (MIA 320) - Credits: 8.00

Curriculum: Final year

Minimum credits: 152

Core modules

Electrical drives 410 (EAD 410) - Credits: 16.00

Automation 410 (EBT 410) - Credits: 16.00

Power system analysis 410 (EKK 410) - Credits: 16.00

Research project 420 (ENR 420) - Credits: 16.00

Project 400 (EPR 400) - Credits: 64.00

Practical training and report 423 (EPY 423) - Credits: 16.00

Engineering professionalism 410 (IPI 410) - Credits: 8.00

BEng Electrical Engineering ENGAGE (12136003)

Minimum duration of study 5 years

Programme information

Please note: The Engineering Augmented Degree Programme (ENGAGE) is an extended degree programme with a five-year curriculum. It is designed to enable students who show academic potential but who do not meet the normal entry requirements for the four-year degree programme, to obtain an Engineering degree. ENGAGE students spend the first three years of the programme covering the content of the first two years of the four-year degree programme. They also take compulsory augmented modules in each of the Level 1 subjects. These augmented modules provide students with background knowledge and skills needed to succeed in an engineering degree. The curriculum for years four and five of the ENGAGE programme are identical to the curriculum for years 3 and 4 of the 4-year programme, respectively. Students may apply directly for admission to the programme.

- Students must register for the entire programme, not components of it. The curriculum is fixed; there are no electives.
- Attendance at all components of years 1 to 3 of the programme is compulsory. Non-attendance will only be condoned in the case of illness (sick note required) or family crisis (e.g. a death in the family), in which case students must inform the programme administration immediately.
- Students who fail to meet the attendance requirement for any module in any semester of years 1 to 3 of the programme will be excluded from the programme.
- No augmented module may be repeated more than once.
- Selection into the programme will be based on a combination of performance in the National Senior Certificate examinations or equivalent and other selection tests approved by the faculty.
- A student who fails a mainstream module (e.g. Chemistry) but passes the associated augmented module (e.g. Additional chemistry) does not need to repeat the augmented module.
- A student who fails an augmented module (e.g. Additional chemistry) but passes the associated mainstream module (e.g. Chemistry) does not need to repeat the mainstream module.
- A student must meet the attendance requirement and obtain at least 40% for both the continuous assessment and test components as well as a final mark of 50% in order to pass an augmented module.
 - i. The curricula of the fourth and the fifth years of study are identical to those of the third and the fourth years of the four-year programme.
 - ii. JPO 110 is a prerequisite for JPO 120. Credit for JPO is obtained with a final mark of more than 50%.
Conditional admission to JPO 120: If the final mark for JPO 110 is between 45% and 49%, a student can register for JPO 120 but credit for JPO 110 and JPO 120 will only be obtained if the final combined mark for JPO 110 and JPO 120 is above 50%.

Please note: All students will be required to successfully complete JCP 203, Community-based project 203, as part of the requirements for the BEng degree. A student may register for the module during any of the years of study of the programme, but preferably not during the first or the final year of study.

Learning outcomes of the BEng degree:

A graduate in engineering should be able to apply the following skills on an advanced level:

- a. Engineering problem solving.
- b. Application of specialist and fundamental knowledge, with specific reference to mathematics, basic sciences and engineering sciences.
- c. Engineering design and synthesis.
- d. Investigation, experimentation and data analysis.
- e. Engineering methods, skills, tools and information technology.
- f. Professional and general communication.
- g. Awareness and knowledge of the impact of engineering activity on society and the physical environment.
- h. Work in teams and in multidisciplinary environments.
- i. An awareness and ability for lifelong learning.
- j. An awareness and knowledge of principles of professional ethics and practice.
- k. Awareness and knowledge of engineering management principles and economic decision-making.

Learning contents of the BEng programmes:

Six essential knowledge areas are included in the syllabi of the programmes. The typical representation of each knowledge area as a percentage of the total contents of an undergraduate programme is given in brackets () in the list below. This percentage varies for the different study directions, but conforms in all instances to the minimum knowledge area content as stipulated by ECSA.

Knowledge areas:

- a. Mathematics, including numerical methods and statistics (13%)
- b. Basic sciences: the natural sciences essential to the programme (15%)
- c. Engineering sciences (40%)
- d. Engineering design and synthesis (16%)
- e. Computing and information technology (5%)
- f. Complementary studies: communication, economy, management, innovation, environmental impact, ethics, engineering practice (11%).

Promotion to next study year

Promotion to the second semester of the first year and to the second year of study (Eng. 14)

- a. A new first-year student who has failed in all the prescribed modules of the programme at the end of the first semester, is excluded from studies in the School of Engineering. A student who is registered for the Engineering Augmented Degree Programme and has passed only 8 credits will also be excluded.
- b. A student who complies with all the requirements of the first year of study, is promoted to the second year of study.
- c. A student who has not passed at least 70% of the credits of the first year of study after the November examinations, must reapply for admission should he/she intend to proceed with his/her studies. Application on the prescribed form must be submitted to the Student Administration of the School of Engineering not later than 11 January. Late applications will be accepted only in exceptional circumstances after approval by the Dean. Should first-year students be readmitted, conditions of readmission will be determined by the Admissions Committee.

-
- d. Students who have not passed all the prescribed modules at first year level (level 100), as well as students who are readmitted in terms of Faculty Regulations must register for the outstanding first-year level (level-100) modules.
 - e. A student who is repeating his or her first year, may, on recommendation of the relevant heads of department and with the approval of the Dean, be permitted to enroll for modules of the second-year of study in addition to the first-year modules which he or she failed, providing that he or she complies with the prerequisites for the second-year modules and no timetable clashes occur. Students on the ENGAGE programme may, following the same procedure, be permitted to enrol for level-200 modules in addition to the level-100 modules which he/she failed providing that he/she complies with the prerequisites for the modules at 200-level and no timetable clashes occur. On recommendation of the relevant head of department and with special permission from the Dean, permission may be granted to exceed the prescribed number of credits. The total number of credits which may be approved may not exceed the normal number of credits per semester by more than 16 credits.
 - f. Students in Computer, Electrical and Electronic Engineering, who fail a first-year module for the second time, forfeit the privilege of registering for any modules of an advanced year of study.

Please note:

- i. From the second year of study each student should be in possession of an approved calculator. It is assumed that each student will have easy access to a laptop computer.
- ii. Students who intend transferring to Mining Engineering, must familiarise themselves with the stipulations set out in the syllabi of PWP 121 Workshop practice 121.

Promotion to the third year of study of the Four-year Programme, as well as to the third and the fourth years of study of the ENGAGE Programme. In case of the fourth year of study of the ENGAGE Programme, the words "first", "second" and "third" must be substituted with the words "second", "third" and "fourth" respectively. (Eng. 15)

- a. A student who complies with all the requirements of the second year of study, is promoted to the third year of study.
- b. A student must pass all the prescribed modules at first year level (level 100) before he or she is admitted to any module at third year level (level 300).
- c. A student who is repeating his or her second year must register for all the second-year modules still outstanding. Such a student may, on recommendation of the relevant head of department and with the approval of the Dean, be permitted to enroll for modules of the third year of study in addition to the second-year modules which he or she failed, providing that he or she complies with the prerequisites for the third-year modules and no timetable clashes occur. On recommendation of the relevant head of department, and with special permission from the Dean, permission may be granted to exceed the prescribed number of credits. The total number of credits which may be approved may not exceed the normal number of credits per semester by more than 16 credits.
- d. Students in Computer, Electrical and Electronic Engineering who fail a second-year module for the second time forfeit the privilege of registering for any modules of the third year of study.
- e. Students who intend transferring to Mining Engineering must familiarise themselves with the stipulations set out in the syllabi of PWP 120 Workshop practice 120, as well as PPY 317 Practical training 317.

Promotion to the fourth year of study of the Four-year Programme, as well as to the fifth year of

study of the ENGAGE Programme. In case of the fifth year of study of the ENGAGE Programme, the words "second", "third" and "fourth" must be substituted with the words "third", "fourth" and "fifth" respectively. (Eng. 16)

- a. A student who complies with all the requirements of the third year of study is promoted to the fourth year of study. A student who does not comply with all the requirements but who is able to register for all outstanding modules in order to complete the degree programme, may at registration be promoted to the fourth year of study.
- b. A student must pass all the prescribed modules of the second year of study, before he or she is admitted to any module of the fourth year of study.
- c. A student who has not passed all the prescribed modules of the third year of study, must register for the outstanding modules. A student may be admitted by the Dean, on the recommendation of the relevant head of department, to modules of the fourth year of study, in addition to the outstanding third-year modules, provided that he or she complies with the prerequisites of the fourth-year modules and no timetable clashes occur. The total number of credits per semester for which a student registers may not exceed the normal number of credits per semester by more than 16 credits. In exceptional cases, the Dean may, on recommendation of the relevant head of department, permit a student to exceed the above limit.
- d. Students in Computer, Electrical and Electronic Engineering who fail a third-year module for the second time, forfeit the privilege of registering for any modules of the fourth year of study.

Pass with distinction

- a. A student graduates with distinction if:
 - i. no module of the third or fourth year of study of the four year programme or of the fourth or fifth year of the ENGAGE programme was repeated and a weighted average of at least 75% was obtained in one year in all the modules of the final year of study; and
 - ii. the degree programme was completed within the prescribed four years for the four year programme and within the prescribed five years of the ENGAGE programme.
- b. Exceptional cases to the above will be considered by the Dean.

Curriculum: Year 1

Minimum credits: 128

Fundamental modules

[Academic orientation 112](#) (UPO 112) - Credits: 0.00

Core modules

[General chemistry 171](#) (CHM 171) - Credits: 16.00

[Physics 176](#) (FSK 176) - Credits: 16.00

[Humanities and social sciences 110](#) (HAS 110) - Credits: 8.00

[Humanities and social sciences 120](#) (HAS 120) - Credits: 8.00

[Professional orientation 110](#) (JPO 110) - Credits: 8.00

[Additional Chemistry 1 111](#) (JPO 111) - Credits: 8.00

[Additional Mathematics 1 116](#) (JPO 116) - Credits: 8.00

[Professional orientation 120](#) (JPO 120) - Credits: 8.00

[Additional Physics 122](#) (JPO 122) - Credits: 8.00

Additional Mathematics 2 126 (JPO 126) - Credits: 8.00
Calculus 158 (WTW 158) - Credits: 16.00
Mathematics 164 (WTW 164) - Credits: 16.00

Curriculum: Year 2

Minimum credits: 124

Core modules

Electricity and electronics 111 (EBN 111) - Credits: 16.00
Practical wiring 200 (EPW 200) - Credits: 4.00
Community-based project 203 (JCP 203) - Credits: 8.00
Additional Electricity and electronics 112 (JPO 112) - Credits: 8.00
Additional Graphical communication 113 (JPO 113) - Credits: 8.00
Additional Materials science 123 (JPO 123) - Credits: 8.00
Additional Mechanics 125 (JPO 125) - Credits: 8.00
Graphical communication 110 (MGC 110) - Credits: 16.00
Materials science 123 (NMC 123) - Credits: 16.00
Mechanics 122 (SWK 122) - Credits: 16.00
Calculus 258 (WTW 258) - Credits: 8.00
Numerical methods 263 (WTW 263) - Credits: 8.00

Curriculum: Year 3

Minimum credits: 124

Core modules

Engineering statistics 220 (BES 220) - Credits: 8.00
Imperative programming 132 (COS 132) - Credits: 16.00
Electrical engineering 211 (EIR 211) - Credits: 16.00
Professional and technical communication 210 (EJJ 210) - Credits: 8.00
Linear systems 220 (ELI 220) - Credits: 16.00
Introduction to programming and computer simulations 101 (EMR 101) - Credits: 4.00
Digital systems 220 (ERS 220) - Credits: 16.00
Dynamics 210 (MSD 210) - Credits: 16.00
Mathematics 238 (WTW 238) - Credits: 16.00
Differential equations 256 (WTW 256) - Credits: 8.00

Curriculum: Year 4

Minimum credits: 144

Core modules

Engineering management 310 (BSS 310) - Credits: 8.00
Control systems 320 (EBB 320) - Credits: 16.00
Power electronics 320 (EDF 320) - Credits: 16.00
Power system components 320 (EKK 320) - Credits: 16.00
Electrical machines 311 (ELX 311) - Credits: 16.00
Microprocessors 310 (EMK 310) - Credits: 16.00
Electromagnetism 310 (EMZ 310) - Credits: 16.00
Analogue electronics 310 (ENE 310) - Credits: 16.00

DSP programming 300 (ESP 300) - Credits: 4.00
Electrical engineering design 320 (EWE 320) - Credits: 16.00
Engineering activity and group work 320 (MIA 320) - Credits: 8.00

Curriculum: Final year

Minimum credits: 152

Core modules

Electrical drives 410 (EAD 410) - Credits: 16.00
Automation 410 (EBT 410) - Credits: 16.00
Power system analysis 410 (EKK 410) - Credits: 16.00
Research project 420 (ENR 420) - Credits: 16.00
Project 400 (EPR 400) - Credits: 64.00
Practical training and report 423 (EPY 423) - Credits: 16.00
Engineering professionalism 410 (IPI 410) - Credits: 8.00

BEng Electronic Engineering (12130008)

Minimum duration of study 4 years

Programme information

All fields of study of the BEng degree have been accredited by the Engineering Council of South Africa (ECSA), and comply with the academic requirements for registration as a professional engineer. The programmes are designed in accordance with the outcomes-based model as required by the South African Qualifications Authority (SAQA). The learning outcomes and contents of the programmes have been compiled in accordance with the latest accreditation standards (PE-60 and PE-61) of ECSA, which also comply with the SAQA requirements, and which are summarised as follows:

Learning outcomes of the BEng degree:

A graduate in engineering should be able to apply the following skills on an advanced level:

- a. Engineering problem solving.
- b. Application of specialist and fundamental knowledge, with specific reference to mathematics, basic sciences and engineering sciences.
- c. Engineering design and synthesis.
- d. Investigation, experimentation and data analysis.
- e. Engineering methods, skills, tools and information technology.
- f. Professional and general communication.
- g. Awareness and knowledge of the impact of engineering activity on society and the physical environment.
- h. Work in teams and in multidisciplinary environments.
- i. An awareness and ability for lifelong learning.
- j. An awareness and knowledge of principles of professional ethics and practice.
- k. Awareness and knowledge of engineering management principles and economic decision-making.

Learning contents of the BEng programmes:

Six essential knowledge areas are included in the syllabi of the programmes. The typical representation of each knowledge area as a percentage of the total contents of an undergraduate programme is given in brackets () in the list below. This percentage varies for the different study directions, but conforms in all instances to the

minimum knowledge area content as stipulated by ECSA.

Knowledge areas:

- Mathematics, including numerical methods and statistics (13%)
- Basic sciences: the natural sciences essential to the programme (15%)
- Engineering sciences (40%)
- Engineering design and synthesis (16%)
- Computing and information technology (5%)
- Complementary studies: communication, economy, management, innovation, environmental impact, ethics, engineering practice (11%).

Admission requirements

- The following persons will be considered for admission: candidates who are in possession of a certificate that is deemed by the University to be equivalent to the required Grade 12 certificate with university endorsement; candidates who are graduates from another tertiary institution or have been granted the status of a graduate of such an institution; and candidates who are graduates of another faculty at the University of Pretoria.
- Life Orientation is excluded when calculating the APS.
- Grade 11 results are used in the conditional admission of prospective students.
- A valid qualification with admission to degree studies is required.
- Minimum subject and achievement requirements, as set out below, are required.
- Conditional admission to the four-year programmes in the School of Engineering is only guaranteed if a prospective student complies with ALL the requirements below.
- Note:** Candidates who do not comply with the minimum requirements, set out above, but who have obtained a minimum APS of 30, an achievement level of 5 for English, 6 for Mathematics and 5 for Physical Science, will be considered for conditional admission to either the four-year programme or the ENGAGE programme based on the results of the NBT.
- Admission to ENGAGE in the School of Engineering will be determined by the results of the NBT, NSC results, an achievement level of 5 in Mathematics and 5 in Physical Science, as well as an achievement level of 5 in English, together with an APS of 30.
- Students may apply directly to be considered for the ENGAGE programme.
- Tuition will be presented in English only.

Minimum requirements

Achievement level

English Home

Language or

English First

Additional

Language

NSC/IEB		Mathematics		Physical Science		APS
AS Level		NSC/IEB	AS Level	NSC/IEB	AS Level	
5	C	6	B	6	B	35

* Cambridge A level candidates who obtained at least a D in the required subjects, will be considered for admission. International Baccalaureate (IB) HL candidates who obtained at least a 4 in the required subjects, will be considered for admission.

ENGAGE Programme minimum requirements

Achievement level

**English Home
Language or
English First
Additional
Language**

Mathematics

Physical Science

APS

NSC/IEB	AS Level	NSC/IEB	AS Level	NSC/IEB	AS Level
5	C	5	C	5	C

30

Other programme-specific information

With a few exceptions, most modules offered at the School of Engineering are semester modules having credit values of either 8 or 16.

A student may be permitted by the Dean, on recommendation of the relevant head of department, to register for an equivalent module in an alternate semester, although the module is normally offered to the student's group in another semester, and providing that no timetable clashes occur.

Please note:

1. All students are required to successfully complete JCP 203, Community-based project 203, as part of the requirements for the BEng degree. A student may register for the module during any of the years of study of the programme, but preferably not during the first or the final year of study.
2. Students registered for Chemical Engineering who have passed CBI 311 or CBI 410, receive credit for CBI 310.
3. Mechanical Engineering: For the Aeronautical Option, the themes of both the Design and the Project must be aeronautical-related.
4. Offering of electives depends on the availability of resources and industry support.

Promotion to next study year

Promotion to the second semester of the first year and to the second year of study (Eng. 14)

- a. A new first-year student who has failed in all the prescribed modules of the programme at the end of the first semester, is excluded from studies in the School of Engineering. A student who is registered for the Engineering Augmented Degree Programme and has passed only 8 credits will also be excluded.
- b. A student who complies with all the requirements of the first year of study, is promoted to the second year of study.
- c. A student who has not passed at least 70% of the credits of the first year of study after the November examinations, must reapply for admission should he/she intend to proceed with his/her studies. Application on the prescribed form must be submitted to the Student Administration of the School of Engineering not later than 11 January. Late applications will be accepted only in exceptional circumstances after approval by the Dean. Should first-year students be readmitted, conditions of readmission will be determined by the Admissions Committee.
- d. Students who have not passed all the prescribed modules at first year level (level 100), as well as students who are readmitted in terms of Faculty Regulations must register for the outstanding first-year level (level-100) modules.
- e. A student who is repeating his or her first year, may, on recommendation of the relevant heads of department and with the approval of the Dean, be permitted to enroll for modules of the second-year of study in addition to the first-year modules which he or she failed, providing that he or she complies with the prerequisites for the second-year modules and no timetable clashes occur. Students on the ENGAGE programme may, following the same procedure, be permitted to enrol for level-200 modules in addition to

the level-100 modules which he/she failed providing that he/she complies with the prerequisites for the modules at 200-level and no timetable clashes occur. On recommendation of the relevant head of department and with special permission from the Dean, permission may be granted to exceed the prescribed number of credits. The total number of credits which may be approved may not exceed the normal number of credits per semester by more than 16 credits.

- f. Students in Computer, Electrical and Electronic Engineering, who fail a first-year module for the second time, forfeit the privilege of registering for any modules of an advanced year of study.

Please note:

- i. From the second year of study each student should be in possession of an approved calculator. It is assumed that each student will have easy access to a laptop computer.
- ii. Students who intend transferring to Mining Engineering, must familiarise themselves with the stipulations set out in the syllabi of PWP 121 Workshop practice 121.

Promotion to the third year of study of the Four-year Programme, as well as to the third and the fourth years of study of the ENGAGE Programme. In case of the fourth year of study of the ENGAGE Programme, the words "first", "second" and "third" must be substituted with the words "second", "third" and "fourth" respectively. (Eng. 15)

- a. A student who complies with all the requirements of the second year of study, is promoted to the third year of study.
- b. A student must pass all the prescribed modules at first year level (level 100) before he or she is admitted to any module at third year level (level 300).
- c. A student who is repeating his or her second year must register for all the second-year modules still outstanding. Such a student may, on recommendation of the relevant head of department and with the approval of the Dean, be permitted to enroll for modules of the third year of study in addition to the second-year modules which he or she failed, providing that he or she complies with the prerequisites for the third-year modules and no timetable clashes occur. On recommendation of the relevant head of department, and with special permission from the Dean, permission may be granted to exceed the prescribed number of credits. The total number of credits which may be approved may not exceed the normal number of credits per semester by more than 16 credits.
- d. Students in Computer, Electrical and Electronic Engineering who fail a second-year module for the second time forfeit the privilege of registering for any modules of the third year of study.
- e. Students who intend transferring to Mining Engineering must familiarise themselves with the stipulations set out in the syllabi of PWP 120 Workshop practice 120, as well as PPY 317 Practical training 317.

Promotion to the fourth year of study of the Four-year Programme, as well as to the fifth year of study of the ENGAGE Programme. In case of the fifth year of study of the ENGAGE Programme, the words "second", "third" and "fourth" must be substituted with the words "third", "fourth" and "fifth" respectively. (Eng. 16)

- a. A student who complies with all the requirements of the third year of study is promoted to the fourth year of study. A student who does not comply with all the requirements but who is able to register for all outstanding modules in order to complete the degree programme, may at registration be promoted to the fourth year of study.
- b. A student must pass all the prescribed modules of the second year of study, before he or she is admitted to

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- any module of the fourth year of study.
- c. A student who has not passed all the prescribed modules of the third year of study, must register for the outstanding modules. A student may be admitted by the Dean, on the recommendation of the relevant head of department, to modules of the fourth year of study, in addition to the outstanding third-year modules, provided that he or she complies with the prerequisites of the fourth-year modules and no timetable clashes occur. The total number of credits per semester for which a student registers may not exceed the normal number of credits per semester by more than 16 credits. In exceptional cases, the Dean may, on recommendation of the relevant head of department, permit a student to exceed the above limit.
 - d. Students in Computer, Electrical and Electronic Engineering who fail a third-year module for the second time, forfeit the privilege of registering for any modules of the fourth year of study.

Pass with distinction

- a. A student graduates with distinction if:
 - i. no module of the third or fourth year of study of the four year programme or of the fourth or fifth year of the ENGAGE programme was repeated and a weighted average of at least 75% was obtained in one year in all the modules of the final year of study; and
 - ii. the degree programme was completed within the prescribed four years for the four year programme and within the prescribed five years of the ENGAGE programme.
- b. Exceptional cases to the above will be considered by the Dean.

Curriculum: Year 1

Minimum credits: 144

Fundamental modules

[Academic orientation 112](#) (UPO 112) - Credits: 0.00

Core modules

[General chemistry 171](#) (CHM 171) - Credits: 16.00

[Electricity and electronics 122](#) (EBN 122) - Credits: 16.00

[Physics 176](#) (FSK 176) - Credits: 16.00

[Humanities and social sciences 110](#) (HAS 110) - Credits: 8.00

[Humanities and social sciences 120](#) (HAS 120) - Credits: 8.00

[Graphical communication 110](#) (MGC 110) - Credits: 16.00

[Materials science 113](#) (NMC 113) - Credits: 16.00

[Mechanics 122](#) (SWK 122) - Credits: 16.00

[Calculus 158](#) (WTW 158) - Credits: 16.00

[Mathematics 164](#) (WTW 164) - Credits: 16.00

Curriculum: Year 2

Minimum credits: 148

Core modules

[Engineering statistics 220](#) (BES 220) - Credits: 8.00

[Imperative programming 132](#) (COS 132) - Credits: 16.00

[Electrical engineering 211](#) (EIR 211) - Credits: 16.00

Professional and technical communication 210 (EJJ 210) - Credits: 8.00
Linear systems 220 (ELI 220) - Credits: 16.00
Introduction to programming and computer simulations 101 (EMR 101) - Credits: 4.00
Digital systems 220 (ERS 220) - Credits: 16.00
Community-based project 203 (JCP 203) - Credits: 8.00
Dynamics 210 (MSD 210) - Credits: 16.00
Mathematics 238 (WTW 238) - Credits: 16.00
Differential equations 256 (WTW 256) - Credits: 8.00
Calculus 258 (WTW 258) - Credits: 8.00
Numerical methods 263 (WTW 263) - Credits: 8.00

Curriculum: Year 3

Minimum credits: 144

Core modules

Engineering management 310 (BSS 310) - Credits: 8.00
Control systems 320 (EBB 320) - Credits: 16.00
Electronic engineering design 320 (ELO 320) - Credits: 16.00
Microprocessors 310 (EMK 310) - Credits: 16.00
Modulation systems 310 (EMS 310) - Credits: 16.00
Electromagnetism 310 (EMZ 310) - Credits: 16.00
Microwaves and antennas 320 (EMZ 320) - Credits: 16.00
Analogue electronics 310 (ENE 310) - Credits: 16.00
Stochastic communications systems 320 (ESC 320) - Credits: 16.00
Engineering activity and group work 320 (MIA 320) - Credits: 8.00

Curriculum: Final year

Minimum credits: 152

Core modules

Automation 410 (EBT 410) - Credits: 16.00
Research project 424 (EES 424) - Credits: 16.00
Advanced electronics 410 (ENE 410) - Credits: 16.00
Project 400 (EPR 400) - Credits: 64.00
Practical training and report 423 (EPY 423) - Credits: 16.00
DSP programming and application 411 (ESP 411) - Credits: 16.00
Engineering professionalism 410 (IPI 410) - Credits: 8.00

BEng Electronic Engineering ENGAGE (12136008)

Minimum duration of study 5 years

Programme information

Please note: The Engineering Augmented Degree Programme (ENGAGE) is an extended degree programme with a five-year curriculum. It is designed to enable students who show academic potential but who do not meet the normal entry requirements for the four-year degree programme, to obtain an Engineering degree. ENGAGE students spend the first three years of the programme covering the content of the first two years of the four-year degree programme. They also take compulsory augmented modules in each of the Level 1 subjects. These

augmented modules provide students with background knowledge and skills needed to succeed in an engineering degree. The curriculum for years four and five of the ENGAGE programme are identical to the curriculum for years 3 and 4 of the 4-year programme, respectively. Students may apply directly for admission to the programme.

- Students must register for the entire programme, not components of it. The curriculum is fixed; there are no electives.
 - Attendance at all components of years 1 to 3 of the programme is compulsory. Non-attendance will only be condoned in the case of illness (sick note required) or family crisis (e.g. a death in the family), in which case students must inform the programme administration immediately.
 - Students who fail to meet the attendance requirement for any module in any semester of years 1 to 3 of the programme will be excluded from the programme.
 - No augmented module may be repeated more than once.
 - Selection into the programme will be based on a combination of performance in the National Senior Certificate examinations or equivalent and other selection tests approved by the faculty.
 - A student who fails a mainstream module (e.g. Chemistry) but passes the associated augmented module (e.g. Additional chemistry) does not need to repeat the augmented module.
 - A student who fails an augmented module (e.g. Additional chemistry) but passes the associated mainstream module (e.g. Chemistry) does not need to repeat the mainstream module.
 - A student must meet the attendance requirement and obtain at least 40% for both the continuous assessment and test components as well as a final mark of 50% in order to pass an augmented module.
- i. The curricula of the fourth and the fifth years of study are identical to those of the third and the fourth years of the four-year programme.
 - ii. JPO 110 is a prerequisite for JPO 120. Credit for JPO is obtained with a final mark of more than 50%.
Conditional admission to JPO 120: If the final mark for JPO 110 is between 45% and 49%, a student can register for JPO 120 but credit for JPO 110 and JPO 120 will only be obtained if the final combined mark for JPO 110 and JPO 120 is above 50%.

Please note: All students will be required to successfully complete JCP 203, Community-based project 203, as part of the requirements for the BEng degree. A student may register for the module during any of the years of study of the programme, but preferably not during the first or the final year of study.

Learning outcomes of the BEng degree:

A graduate in engineering should be able to apply the following skills on an advanced level:

- a. Engineering problem solving.
- b. Application of specialist and fundamental knowledge, with specific reference to mathematics, basic sciences and engineering sciences.
- c. Engineering design and synthesis.
- d. Investigation, experimentation and data analysis.
- e. Engineering methods, skills, tools and information technology.
- f. Professional and general communication.
- g. Awareness and knowledge of the impact of engineering activity on society and the physical environment.
- h. Work in teams and in multidisciplinary environments.
- i. An awareness and ability for lifelong learning.
- j. An awareness and knowledge of principles of professional ethics and practice.
- k. Awareness and knowledge of engineering management principles and economic decision-making.

Learning contents of the BEng programmes:

Six essential knowledge areas are included in the syllabi of the programmes. The typical representation of each knowledge area as a percentage of the total contents of an undergraduate programme is given in brackets () in the list below. This percentage varies for the different study directions, but conforms in all instances to the minimum knowledge area content as stipulated by ECSA.

Knowledge areas:

- a. Mathematics, including numerical methods and statistics (13%)
- b. Basic sciences: the natural sciences essential to the programme (15%)
- c. Engineering sciences (40%)
- d. Engineering design and synthesis (16%)
- e. Computing and information technology (5%)
- f. Complementary studies: communication, economy, management, innovation, environmental impact, ethics, engineering practice (11%).

Promotion to next study year

Promotion to the second semester of the first year and to the second year of study (Eng. 14)

- a. A new first-year student who has failed in all the prescribed modules of the programme at the end of the first semester, is excluded from studies in the School of Engineering. A student who is registered for the Engineering Augmented Degree Programme and has passed only 8 credits will also be excluded.
- b. A student who complies with all the requirements of the first year of study, is promoted to the second year of study.
- c. A student who has not passed at least 70% of the credits of the first year of study after the November examinations, must reapply for admission should he/she intend to proceed with his/her studies. Application on the prescribed form must be submitted to the Student Administration of the School of Engineering not later than 11 January. Late applications will be accepted only in exceptional circumstances after approval by the Dean. Should first-year students be readmitted, conditions of readmission will be determined by the Admissions Committee.
- d. Students who have not passed all the prescribed modules at first year level (level 100), as well as students who are readmitted in terms of Faculty Regulations must register for the outstanding first-year level (level-100) modules.
- e. A student who is repeating his or her first year, may, on recommendation of the relevant heads of department and with the approval of the Dean, be permitted to enroll for modules of the second-year of study in addition to the first-year modules which he or she failed, providing that he or she complies with the prerequisites for the second-year modules and no timetable clashes occur. Students on the ENGAGE programme may, following the same procedure, be permitted to enrol for level-200 modules in addition to the level-100 modules which he/she failed providing that he/she complies with the prerequisites for the modules at 200-level and no timetable clashes occur. On recommendation of the relevant head of department and with special permission from the Dean, permission may be granted to exceed the prescribed number of credits. The total number of credits which may be approved may not exceed the normal number of credits per semester by more than 16 credits.
- f. Students in Computer, Electrical and Electronic Engineering, who fail a first-year module for the second time, forfeit the privilege of registering for any modules of an advanced year of study.

Please note:

- i. From the second year of study each student should be in possession of an approved calculator. It is assumed

that each student will have easy access to a laptop computer.

- ii. Students who intend transferring to Mining Engineering, must familiarise themselves with the stipulations set out in the syllabi of PWP 121 Workshop practice 121.

Promotion to the third year of study of the Four-year Programme, as well as to the third and the fourth years of study of the ENGAGE Programme. In case of the fourth year of study of the ENGAGE Programme, the words "first", "second" and "third" must be substituted with the words "second", "third" and "fourth" respectively. (Eng. 15)

- a. A student who complies with all the requirements of the second year of study, is promoted to the third year of study.
- b. A student must pass all the prescribed modules at first year level (level 100) before he or she is admitted to any module at third year level (level 300).
- c. A student who is repeating his or her second year must register for all the second-year modules still outstanding. Such a student may, on recommendation of the relevant head of department and with the approval of the Dean, be permitted to enroll for modules of the third year of study in addition to the second-year modules which he or she failed, providing that he or she complies with the prerequisites for the third-year modules and no timetable clashes occur. On recommendation of the relevant head of department, and with special permission from the Dean, permission may be granted to exceed the prescribed number of credits. The total number of credits which may be approved may not exceed the normal number of credits per semester by more than 16 credits.
- d. Students in Computer, Electrical and Electronic Engineering who fail a second-year module for the second time forfeit the privilege of registering for any modules of the third year of study.
- e. Students who intend transferring to Mining Engineering must familiarise themselves with the stipulations set out in the syllabi of PWP 120 Workshop practice 120, as well as PPY 317 Practical training 317.

Promotion to the fourth year of study of the Four-year Programme, as well as to the fifth year of study of the ENGAGE Programme. In case of the fifth year of study of the ENGAGE Programme, the words "second", "third" and "fourth" must be substituted with the words "third", "fourth" and "fifth" respectively. (Eng. 16)

- a. A student who complies with all the requirements of the third year of study is promoted to the fourth year of study. A student who does not comply with all the requirements but who is able to register for all outstanding modules in order to complete the degree programme, may at registration be promoted to the fourth year of study.
- b. A student must pass all the prescribed modules of the second year of study, before he or she is admitted to any module of the fourth year of study.
- c. A student who has not passed all the prescribed modules of the third year of study, must register for the outstanding modules. A student may be admitted by the Dean, on the recommendation of the relevant head of department, to modules of the fourth year of study, in addition to the outstanding third-year modules, provided that he or she complies with the prerequisites of the fourth-year modules and no timetable clashes occur. The total number of credits per semester for which a student registers may not exceed the normal number of credits per semester by more than 16 credits. In exceptional cases, the Dean may, on recommendation of the relevant head of department, permit a student to exceed the above limit.
- d. Students in Computer, Electrical and Electronic Engineering who fail a third-year module for the second time, forfeit the privilege of registering for any modules of the fourth year of study.

Pass with distinction

- a. A student graduates with distinction if:
 - i. no module of the third or fourth year of study of the four year programme or of the fourth or fifth year of the ENGAGE programme was repeated and a weighted average of at least 75% was obtained in one year in all the modules of the final year of study; and
 - ii. the degree programme was completed within the prescribed four years for the four year programme and within the prescribed five years of the ENGAGE programme.
- b. Exceptional cases to the above will be considered by the Dean.

Curriculum: Year 1

Minimum credits: 128

Fundamental modules

[Academic orientation 112](#) (UPO 112) - Credits: 0.00

Core modules

[General chemistry 171](#) (CHM 171) - Credits: 16.00

[Physics 176](#) (FSK 176) - Credits: 16.00

[Humanities and social sciences 110](#) (HAS 110) - Credits: 8.00

[Humanities and social sciences 120](#) (HAS 120) - Credits: 8.00

[Professional orientation 110](#) (JPO 110) - Credits: 8.00

[Additional Chemistry 1 111](#) (JPO 111) - Credits: 8.00

[Additional Mathematics 1 116](#) (JPO 116) - Credits: 8.00

[Professional orientation 120](#) (JPO 120) - Credits: 8.00

[Additional Physics 122](#) (JPO 122) - Credits: 8.00

[Additional Mathematics 2 126](#) (JPO 126) - Credits: 8.00

[Calculus 158](#) (WTW 158) - Credits: 16.00

[Mathematics 164](#) (WTW 164) - Credits: 16.00

Curriculum: Year 2

Minimum credits: 120

Core modules

[Electricity and electronics 111](#) (EBN 111) - Credits: 16.00

[Community-based project 203](#) (JCP 203) - Credits: 8.00

[Additional Electricity and electronics 112](#) (JPO 112) - Credits: 8.00

[Additional Graphical communication 113](#) (JPO 113) - Credits: 8.00

[Additional Materials science 123](#) (JPO 123) - Credits: 8.00

[Additional Mechanics 125](#) (JPO 125) - Credits: 8.00

[Graphical communication 110](#) (MGC 110) - Credits: 16.00

[Materials science 123](#) (NMC 123) - Credits: 16.00

[Mechanics 122](#) (SWK 122) - Credits: 16.00

[Calculus 258](#) (WTW 258) - Credits: 8.00

[Numerical methods 263](#) (WTW 263) - Credits: 8.00

Curriculum: Year 3

Minimum credits: 124

Core modules

Engineering statistics 220 (BES 220) - Credits: 8.00
Imperative programming 132 (COS 132) - Credits: 16.00
Electrical engineering 211 (EIR 211) - Credits: 16.00
Professional and technical communication 210 (EJJ 210) - Credits: 8.00
Linear systems 220 (ELI 220) - Credits: 16.00
Introduction to programming and computer simulations 101 (EMR 101) - Credits: 4.00
Digital systems 220 (ERS 220) - Credits: 16.00
Dynamics 210 (MSD 210) - Credits: 16.00
Mathematics 238 (WTW 238) - Credits: 16.00
Differential equations 256 (WTW 256) - Credits: 8.00

Curriculum: Year 4

Minimum credits: 144

Core modules

Engineering management 310 (BSS 310) - Credits: 8.00
Control systems 320 (EBB 320) - Credits: 16.00
Electronic engineering design 320 (ELO 320) - Credits: 16.00
Microprocessors 310 (EMK 310) - Credits: 16.00
Modulation systems 310 (EMS 310) - Credits: 16.00
Electromagnetism 310 (EMZ 310) - Credits: 16.00
Microwaves and antennas 320 (EMZ 320) - Credits: 16.00
Analogue electronics 310 (ENE 310) - Credits: 16.00
Stochastic communications systems 320 (ESC 320) - Credits: 16.00
Engineering activity and group work 320 (MIA 320) - Credits: 8.00

Curriculum: Final year

Minimum credits: 152

Core modules

Automation 410 (EBT 410) - Credits: 16.00
Research project 424 (EES 424) - Credits: 16.00
Advanced electronics 410 (ENE 410) - Credits: 16.00
Project 400 (EPR 400) - Credits: 64.00
Practical training and report 423 (EPY 423) - Credits: 16.00
DSP programming and application 411 (ESP 411) - Credits: 16.00
Engineering professionalism 410 (IPI 410) - Credits: 8.00

BEng Industrial Engineering (12130001)

Minimum duration of study 4 years

Programme information

All fields of study of the BEng degree have been accredited by the Engineering Council of South Africa (ECSA),

and comply with the academic requirements for registration as a professional engineer. The programmes are designed in accordance with the outcomes-based model as required by the South African Qualifications Authority (SAQA). The learning outcomes and contents of the programmes have been compiled in accordance with the latest accreditation standards (PE-60 and PE-61) of ECSA, which also comply with the SAQA requirements, and which are summarised as follows:

Learning outcomes of the BEng degree:

A graduate in engineering should be able to apply the following skills on an advanced level:

- a. Engineering problem solving.
- b. Application of specialist and fundamental knowledge, with specific reference to mathematics, basic sciences and engineering sciences.
- c. Engineering design and synthesis.
- d. Investigation, experimentation and data analysis.
- e. Engineering methods, skills, tools and information technology.
- f. Professional and general communication.
- g. Awareness and knowledge of the impact of engineering activity on society and the physical environment.
- h. Work in teams and in multidisciplinary environments.
 - i. An awareness and ability for lifelong learning.
 - j. An awareness and knowledge of principles of professional ethics and practice.
- k. Awareness and knowledge of engineering management principles and economic decision-making.

Learning contents of the BEng programmes:

Six essential knowledge areas are included in the syllabi of the programmes. The typical representation of each knowledge area as a percentage of the total contents of an undergraduate programme is given in brackets () in the list below. This percentage varies for the different study directions, but conforms in all instances to the minimum knowledge area content as stipulated by ECSA.

Knowledge areas:

- a. Mathematics, including numerical methods and statistics (13%)
- b. Basic sciences: the natural sciences essential to the programme (15%)
- c. Engineering sciences (40%)
- d. Engineering design and synthesis (16%)
- e. Computing and information technology (5%)
- f. Complementary studies: communication, economy, management, innovation, environmental impact, ethics, engineering practice (11%).

Admission requirements

- The following persons will be considered for admission: candidates who are in possession of a certificate that is deemed by the University to be equivalent to the required Grade 12 certificate with university endorsement; candidates who are graduates from another tertiary institution or have been granted the status of a graduate of such an institution; and candidates who are graduates of another faculty at the University of Pretoria.
- Life Orientation is excluded when calculating the APS.
- Grade 11 results are used in the conditional admission of prospective students.
- A valid qualification with admission to degree studies is required.
- Minimum subject and achievement requirements, as set out below, are required.
- Conditional admission to the four-year programmes in the School of Engineering is only guaranteed if a prospective student complies with ALL the requirements below.

- **Note:** Candidates who do not comply with the minimum requirements, set out above, but who have obtained a minimum APS of 30, an achievement level of 5 for English, 6 for Mathematics and 5 for Physical Science, will be considered for conditional admission to either the four-year programme or the ENGAGE programme based on the results of the NBT.
- Admission to ENGAGE in the School of Engineering will be determined by the results of the NBT, NSC results, an achievement level of 5 in Mathematics and 5 in Physical Science, as well as an achievement level of 5 in English, together with an APS of 30.
- Students may apply directly to be considered for the ENGAGE programme.
- Tuition will be presented in English only.

Minimum requirements

Achievement level

English Home

Language or

English First

Additional

Language

		Mathematics		Physical Science		APS
NSC/IEB	AS Level	NSC/IEB	AS Level	NSC/IEB	AS Level	
5	C	6	B	6	B	35

* Cambridge A level candidates who obtained at least a D in the required subjects, will be considered for admission. International Baccalaureate (IB) HL candidates who obtained at least a 4 in the required subjects, will be considered for admission.

ENGAGE Programme minimum requirements

Achievement level

English Home

Language or

English First

Additional

Language

		Mathematics		Physical Science		APS
NSC/IEB	AS Level	NSC/IEB	AS Level	NSC/IEB	AS Level	
5	C	5	C	5	C	30

Other programme-specific information

With a few exceptions, most modules offered at the School of Engineering are semester modules having credit values of either 8 or 16.

A student may be permitted by the Dean, on recommendation of the relevant head of department, to register for an equivalent module in an alternate semester, although the module is normally offered to the student's group in another semester, and providing that no timetable clashes occur.

Please note:

1. All students are required to successfully complete JCP 203, Community-based project 203, as part of the requirements for the BEng degree. A student may register for the module during any of the years of study of the programme, but preferably not during the first or the final year of study.
2. Students registered for Chemical Engineering who have passed CBI 311 or CBI 410, receive credit for CBI 310.
3. Mechanical Engineering: For the Aeronautical Option, the themes of both the Design and the Project must be aeronautical-related.

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4. Offering of electives depends on the availability of resources and industry support.

Promotion to next study year

Promotion to the second semester of the first year and to the second year of study (Eng. 14)

- a. A new first-year student who has failed in all the prescribed modules of the programme at the end of the first semester, is excluded from studies in the School of Engineering. A student who is registered for the Engineering Augmented Degree Programme and has passed only 8 credits will also be excluded.
- b. A student who complies with all the requirements of the first year of study, is promoted to the second year of study.
- c. A student who has not passed at least 70% of the credits of the first year of study after the November examinations, must reapply for admission should he/she intend to proceed with his/her studies. Application on the prescribed form must be submitted to the Student Administration of the School of Engineering not later than 11 January. Late applications will be accepted only in exceptional circumstances after approval by the Dean. Should first-year students be readmitted, conditions of readmission will be determined by the Admissions Committee.
- d. Students who have not passed all the prescribed modules at first year level (level 100), as well as students who are readmitted in terms of Faculty Regulations must register for the outstanding first-year level (level-100) modules.
- e. A student who is repeating his or her first year, may, on recommendation of the relevant heads of department and with the approval of the Dean, be permitted to enroll for modules of the second-year of study in addition to the first-year modules which he or she failed, providing that he or she complies with the prerequisites for the second-year modules and no timetable clashes occur. Students on the ENGAGE programme may, following the same procedure, be permitted to enrol for level-200 modules in addition to the level-100 modules which he/she failed providing that he/she complies with the prerequisites for the modules at 200-level and no timetable clashes occur. On recommendation of the relevant head of department and with special permission from the Dean, permission may be granted to exceed the prescribed number of credits. The total number of credits which may be approved may not exceed the normal number of credits per semester by more than 16 credits.
- f. Students in Computer, Electrical and Electronic Engineering, who fail a first-year module for the second time, forfeit the privilege of registering for any modules of an advanced year of study.

Please note:

- i. From the second year of study each student should be in possession of an approved calculator. It is assumed that each student will have easy access to a laptop computer.
- ii. Students who intend transferring to Mining Engineering, must familiarise themselves with the stipulations set out in the syllabi of PWP 121 Workshop practice 121.

Promotion to the third year of study of the Four-year Programme, as well as to the third and the fourth years of study of the ENGAGE Programme. In case of the fourth year of study of the ENGAGE Programme, the words "first", "second" and "third" must be substituted with the words "second", "third" and "fourth" respectively. (Eng. 15)

- a. A student who complies with all the requirements of the second year of study, is promoted to the third year of study.
- b. A student must pass all the prescribed modules at first year level (level 100) before he or she is admitted to

any module at third year level (level 300).

- c. A student who is repeating his or her second year must register for all the second-year modules still outstanding. Such a student may, on recommendation of the relevant head of department and with the approval of the Dean, be permitted to enroll for modules of the third year of study in addition to the second-year modules which he or she failed, providing that he or she complies with the prerequisites for the third-year modules and no timetable clashes occur. On recommendation of the relevant head of department, and with special permission from the Dean, permission may be granted to exceed the prescribed number of credits. The total number of credits which may be approved may not exceed the normal number of credits per semester by more than 16 credits.
- d. Students in Computer, Electrical and Electronic Engineering who fail a second-year module for the second time forfeit the privilege of registering for any modules of the third year of study.
- e. Students who intend transferring to Mining Engineering must familiarise themselves with the stipulations set out in the syllabi of PWP 120 Workshop practice 120, as well as PPY 317 Practical training 317.

Promotion to the fourth year of study of the Four-year Programme, as well as to the fifth year of study of the ENGAGE Programme. In case of the fifth year of study of the ENGAGE Programme, the words "second", "third" and "fourth" must be substituted with the words "third", "fourth" and "fifth" respectively. (Eng. 16)

- a. A student who complies with all the requirements of the third year of study is promoted to the fourth year of study. A student who does not comply with all the requirements but who is able to register for all outstanding modules in order to complete the degree programme, may at registration be promoted to the fourth year of study.
- b. A student must pass all the prescribed modules of the second year of study, before he or she is admitted to any module of the fourth year of study.
- c. A student who has not passed all the prescribed modules of the third year of study, must register for the outstanding modules. A student may be admitted by the Dean, on the recommendation of the relevant head of department, to modules of the fourth year of study, in addition to the outstanding third-year modules, provided that he or she complies with the prerequisites of the fourth-year modules and no timetable clashes occur. The total number of credits per semester for which a student registers may not exceed the normal number of credits per semester by more than 16 credits. In exceptional cases, the Dean may, on recommendation of the relevant head of department, permit a student to exceed the above limit.
- d. Students in Computer, Electrical and Electronic Engineering who fail a third-year module for the second time, forfeit the privilege of registering for any modules of the fourth year of study.

Pass with distinction

- a. A student graduates with distinction if:
 - i. no module of the third or fourth year of study of the four year programme or of the fourth or fifth year of the ENGAGE programme was repeated and a weighted average of at least 75% was obtained in one year in all the modules of the final year of study; and
 - ii. the degree programme was completed within the prescribed four years for the four year programme and within the prescribed five years of the ENGAGE programme.
- b. Exceptional cases to the above will be considered by the Dean.

Curriculum: Year 1

Minimum credits: 144

Fundamental modules

Academic orientation 112 (UPO 112) - Credits: 0.00

Core modules

General chemistry 172 (CHM 172) - Credits: 16.00

Electricity and electronics 111 (EBN 111) - Credits: 16.00

Physics 116 (FSK 116) - Credits: 16.00

Humanities and social sciences 110 (HAS 110) - Credits: 8.00

Humanities and social sciences 120 (HAS 120) - Credits: 8.00

Graphical communication 110 (MGC 110) - Credits: 16.00

Materials science 123 (NMC 123) - Credits: 16.00

Mechanics 122 (SWK 122) - Credits: 16.00

Calculus 158 (WTW 158) - Credits: 16.00

Mathematics 164 (WTW 164) - Credits: 16.00

Workshop practice 121 (WWP 121) - Credits: 6.00

Curriculum: Year 2

Minimum credits: 144

Core modules

Engineering statistics 220 (BES 220) - Credits: 8.00

Professional and technical communication 210 (BJJ 210) - Credits: 8.00

Productivity 220 (BPZ 220) - Credits: 16.00

Community-based project 203 (JCP 203) - Credits: 8.00

Manufacturing and design 217 (MOW 217) - Credits: 16.00

Programming and information technology 213 (MPR 213) - Credits: 16.00

Dynamics 210 (MSD 210) - Credits: 16.00

Thermodynamics 221 (MTX 221) - Credits: 16.00

Mathematics 238 (WTW 238) - Credits: 16.00

Differential equations 256 (WTW 256) - Credits: 8.00

Calculus 258 (WTW 258) - Credits: 8.00

Numerical methods 263 (WTW 263) - Credits: 8.00

Curriculum: Year 3

Minimum credits: 154

Core modules

Industrial analysis 313 (BAN 313) - Credits: 8.00

Facilities planning 320 (BFB 320) - Credits: 8.00

Information systems design 320 (BID 320) - Credits: 16.00

Industrial logistics 320 (BLK 320) - Credits: 16.00

Operational management 310 (BOB 310) - Credits: 16.00

Operational research 312 (BOZ 312) - Credits: 16.00

Practical training 310 (BPY 310) - Credits: 16.00

Business engineering 321 (BPZ 321) - Credits: 16.00

Engineering management 310 (BSS 310) - Credits: 8.00
Simulation modelling 321 (BUY 321) - Credits: 16.00
Financial management 110 (FBS 110) - Credits: 10.00
Engineering activity and group work 320 (MIA 320) - Credits: 8.00
Manufacturing systems 311 (MVS 311) - Credits: 16.00

Curriculum: Final year

Minimum credits: 144

Core modules

Labour relations 320 (ABV 320) - Credits: 20.00
Business law 310 (BER 310) - Credits: 10.00
Quality assurance 410 (BGC 410) - Credits: 16.00
Engineering economics 420 (BIE 420) - Credits: 8.00
Operational research 410 (BON 410) - Credits: 16.00
Project 410 (BPJ 410) - Credits: 16.00
Project 420 (BPJ 420) - Credits: 24.00
Practical training 410 (BPY 410) - Credits: 16.00
Management accounting 410 (BSR 410) - Credits: 16.00
Systems engineering 410 (BSS 410) - Credits: 16.00
Engineering professionalism 410 (IPI 410) - Credits: 8.00

BEng Industrial Engineering ENGAGE (12136001)

Minimum duration of study 5 years

Programme information

Please note: The Engineering Augmented Degree Programme (ENGAGE) is an extended degree programme with a five-year curriculum. It is designed to enable students who show academic potential but who do not meet the normal entry requirements for the four-year degree programme, to obtain an Engineering degree. ENGAGE students spend the first three years of the programme covering the content of the first two years of the four-year degree programme. They also take compulsory augmented modules in each of the Level 1 subjects. These augmented modules provide students with background knowledge and skills needed to succeed in an engineering degree. The curriculum for years four and five of the ENGAGE programme are identical to the curriculum for years 3 and 4 of the 4-year programme, respectively. Students may apply directly for admission to the programme.

- Students must register for the entire programme, not components of it. The curriculum is fixed; there are no electives.
- Attendance at all components of years 1 to 3 of the programme is compulsory. Non-attendance will only be condoned in the case of illness (sick note required) or family crisis (e.g. a death in the family), in which case students must inform the programme administration immediately.
- Students who fail to meet the attendance requirement for any module in any semester of years 1 to 3 of the programme will be excluded from the programme.
- No augmented module may be repeated more than once.
- Selection into the programme will be based on a combination of performance in the National Senior Certificate examinations or equivalent and other selection tests approved by the faculty.
- A student who fails a mainstream module (e.g. Chemistry) but passes the associated augmented module (e.g.

Additional chemistry) does not need to repeat the augmented module.

- A student who fails an augmented module (e.g. Additional chemistry) but passes the associated mainstream module (e.g. Chemistry) does not need to repeat the mainstream module.
- A student must meet the attendance requirement and obtain at least 40% for both the continuous assessment and test components as well as a final mark of 50% in order to pass an augmented module.
- i. The curricula of the fourth and the fifth years of study are identical to those of the third and the fourth years of the four-year programme.
- ii. JPO 110 is a prerequisite for JPO 120. Credit for JPO is obtained with a final mark of more than 50%.
Conditional admission to JPO 120: If the final mark for JPO 110 is between 45% and 49%, a student can register for JPO 120 but credit for JPO 110 and JPO 120 will only be obtained if the final combined mark for JPO 110 and JPO 120 is above 50%.

Please note: All students will be required to successfully complete JCP 203, Community-based project 203, as part of the requirements for the BEng degree. A student may register for the module during any of the years of study of the programme, but preferably not during the first or the final year of study.

Learning outcomes of the BEng degree:

A graduate in engineering should be able to apply the following skills on an advanced level:

- a. Engineering problem solving.
- b. Application of specialist and fundamental knowledge, with specific reference to mathematics, basic sciences and engineering sciences.
- c. Engineering design and synthesis.
- d. Investigation, experimentation and data analysis.
- e. Engineering methods, skills, tools and information technology.
- f. Professional and general communication.
- g. Awareness and knowledge of the impact of engineering activity on society and the physical environment.
- h. Work in teams and in multidisciplinary environments.
- i. An awareness and ability for lifelong learning.
- j. An awareness and knowledge of principles of professional ethics and practice.
- k. Awareness and knowledge of engineering management principles and economic decision-making.

Learning contents of the BEng programmes:

Six essential knowledge areas are included in the syllabi of the programmes. The typical representation of each knowledge area as a percentage of the total contents of an undergraduate programme is given in brackets () in the list below. This percentage varies for the different study directions, but conforms in all instances to the minimum knowledge area content as stipulated by ECSA.

Knowledge areas:

- a. Mathematics, including numerical methods and statistics (13%)
- b. Basic sciences: the natural sciences essential to the programme (15%)
- c. Engineering sciences (40%)
- d. Engineering design and synthesis (16%)
- e. Computing and information technology (5%)
- f. Complementary studies: communication, economy, management, innovation, environmental impact, ethics, engineering practice (11%).

Promotion to next study year

Promotion to the second semester of the first year and to the second year of study (Eng. 14)

- a. A new first-year student who has failed in all the prescribed modules of the programme at the end of the first semester, is excluded from studies in the School of Engineering. A student who is registered for the Engineering Augmented Degree Programme and has passed only 8 credits will also be excluded.
- b. A student who complies with all the requirements of the first year of study, is promoted to the second year of study.
- c. A student who has not passed at least 70% of the credits of the first year of study after the November examinations, must reapply for admission should he/she intend to proceed with his/her studies. Application on the prescribed form must be submitted to the Student Administration of the School of Engineering not later than 11 January. Late applications will be accepted only in exceptional circumstances after approval by the Dean. Should first-year students be readmitted, conditions of readmission will be determined by the Admissions Committee.
- d. Students who have not passed all the prescribed modules at first year level (level 100), as well as students who are readmitted in terms of Faculty Regulations must register for the outstanding first-year level (level-100) modules.
- e. A student who is repeating his or her first year, may, on recommendation of the relevant heads of department and with the approval of the Dean, be permitted to enroll for modules of the second-year of study in addition to the first-year modules which he or she failed, providing that he or she complies with the prerequisites for the second-year modules and no timetable clashes occur. Students on the ENGAGE programme may, following the same procedure, be permitted to enrol for level-200 modules in addition to the level-100 modules which he/she failed providing that he/she complies with the prerequisites for the modules at 200-level and no timetable clashes occur. On recommendation of the relevant head of department and with special permission from the Dean, permission may be granted to exceed the prescribed number of credits. The total number of credits which may be approved may not exceed the normal number of credits per semester by more than 16 credits.
- f. Students in Computer, Electrical and Electronic Engineering, who fail a first-year module for the second time, forfeit the privilege of registering for any modules of an advanced year of study.

Please note:

- i. From the second year of study each student should be in possession of an approved calculator. It is assumed that each student will have easy access to a laptop computer.
- ii. Students who intend transferring to Mining Engineering, must familiarise themselves with the stipulations set out in the syllabi of PWP 121 Workshop practice 121.

Promotion to the third year of study of the Four-year Programme, as well as to the third and the fourth years of study of the ENGAGE Programme. In case of the fourth year of study of the ENGAGE Programme, the words "first", "second" and "third" must be substituted with the words "second", "third" and "fourth" respectively. (Eng. 15)

- a. A student who complies with all the requirements of the second year of study, is promoted to the third year of study.
- b. A student must pass all the prescribed modules at first year level (level 100) before he or she is admitted to any module at third year level (level 300).
- c. A student who is repeating his or her second year must register for all the second-year modules still outstanding. Such a student may, on recommendation of the relevant head of department and with the

approval of the Dean, be permitted to enroll for modules of the third year of study in addition to the second-year modules which he or she failed, providing that he or she complies with the prerequisites for the third-year modules and no timetable clashes occur. On recommendation of the relevant head of department, and with special permission from the Dean, permission may be granted to exceed the prescribed number of credits. The total number of credits which may be approved may not exceed the normal number of credits per semester by more than 16 credits.

- d. Students in Computer, Electrical and Electronic Engineering who fail a second-year module for the second time forfeit the privilege of registering for any modules of the third year of study.
- e. Students who intend transferring to Mining Engineering must familiarise themselves with the stipulations set out in the syllabi of PWP 120 Workshop practice 120, as well as PPY 317 Practical training 317.

Promotion to the fourth year of study of the Four-year Programme, as well as to the fifth year of study of the ENGAGE Programme. In case of the fifth year of study of the ENGAGE Programme, the words "second", "third" and "fourth" must be substituted with the words "third", "fourth" and "fifth" respectively. (Eng. 16)

- a. A student who complies with all the requirements of the third year of study is promoted to the fourth year of study. A student who does not comply with all the requirements but who is able to register for all outstanding modules in order to complete the degree programme, may at registration be promoted to the fourth year of study.
- b. A student must pass all the prescribed modules of the second year of study, before he or she is admitted to any module of the fourth year of study.
- c. A student who has not passed all the prescribed modules of the third year of study, must register for the outstanding modules. A student may be admitted by the Dean, on the recommendation of the relevant head of department, to modules of the fourth year of study, in addition to the outstanding third-year modules, provided that he or she complies with the prerequisites of the fourth-year modules and no timetable clashes occur. The total number of credits per semester for which a student registers may not exceed the normal number of credits per semester by more than 16 credits. In exceptional cases, the Dean may, on recommendation of the relevant head of department, permit a student to exceed the above limit.
- d. Students in Computer, Electrical and Electronic Engineering who fail a third-year module for the second time, forfeit the privilege of registering for any modules of the fourth year of study.

Pass with distinction

- a. A student graduates with distinction if:
 - i. no module of the third or fourth year of study of the four year programme or of the fourth or fifth year of the ENGAGE programme was repeated and a weighted average of at least 75% was obtained in one year in all the modules of the final year of study; and
 - ii. the degree programme was completed within the prescribed four years for the four year programme and within the prescribed five years of the ENGAGE programme.
- b. Exceptional cases to the above will be considered by the Dean.

Curriculum: Year 1

Minimum credits: 128

Core modules

General chemistry 172 (CHM 172) - Credits: 16.00
Physics 116 (FSK 116) - Credits: 16.00
Humanities and social sciences 110 (HAS 110) - Credits: 8.00
Humanities and social sciences 120 (HAS 120) - Credits: 8.00
Professional orientation 110 (JPO 110) - Credits: 8.00
Additional Mathematics 1 116 (JPO 116) - Credits: 8.00
Professional orientation 120 (JPO 120) - Credits: 8.00
Additional Mathematics 2 126 (JPO 126) - Credits: 8.00
Additional Physics 152 (JPO 152) - Credits: 8.00
Additional Chemistry 1 161 (JPO 161) - Credits: 8.00
Calculus 158 (WTW 158) - Credits: 16.00
Mathematics 164 (WTW 164) - Credits: 16.00
Workshop practice 121 (WWP 121) - Credits: 6.00

Curriculum: Year 2

Minimum credits: 120

Core modules

Electricity and electronics 111 (EBN 111) - Credits: 16.00
Community-based project 203 (JCP 203) - Credits: 8.00
Additional Electricity and electronics 112 (JPO 112) - Credits: 8.00
Additional Graphical communication 113 (JPO 113) - Credits: 8.00
Additional Materials science 123 (JPO 123) - Credits: 8.00
Additional Mechanics 125 (JPO 125) - Credits: 8.00
Graphical communication 110 (MGC 110) - Credits: 16.00
Materials science 123 (NMC 123) - Credits: 16.00
Mechanics 122 (SWK 122) - Credits: 16.00
Calculus 258 (WTW 258) - Credits: 8.00
Numerical methods 263 (WTW 263) - Credits: 8.00

Curriculum: Year 3

Minimum credits: 122

Core modules

Engineering statistics 220 (BES 220) - Credits: 8.00
Professional and technical communication 210 (BJJ 210) - Credits: 8.00
Productivity 220 (BPZ 220) - Credits: 16.00
Manufacturing and design 217 (MOW 217) - Credits: 16.00
Programming and information technology 213 (MPR 213) - Credits: 16.00
Dynamics 210 (MSD 210) - Credits: 16.00
Thermodynamics 221 (MTX 221) - Credits: 16.00
Mathematics 238 (WTW 238) - Credits: 16.00
Differential equations 256 (WTW 256) - Credits: 8.00

Curriculum: Year 4

Minimum credits: 154

Core modules

Industrial analysis 313 (BAN 313) - Credits: 8.00
Facilities planning 320 (BFB 320) - Credits: 8.00
Information systems design 320 (BID 320) - Credits: 16.00
Industrial logistics 320 (BLK 320) - Credits: 16.00
Operational management 310 (BOB 310) - Credits: 16.00
Operational research 312 (BOZ 312) - Credits: 16.00
Practical training 310 (BPY 310) - Credits: 16.00
Business engineering 321 (BPZ 321) - Credits: 16.00
Engineering management 310 (BSS 310) - Credits: 8.00
Simulation modelling 321 (BUY 321) - Credits: 16.00
Financial management 110 (FBS 110) - Credits: 10.00
Engineering activity and group work 320 (MIA 320) - Credits: 8.00
Manufacturing systems 311 (MVS 311) - Credits: 16.00

Curriculum: Final year

Minimum credits: 144

Core modules

Labour relations 320 (ABV 320) - Credits: 20.00
Business law 310 (BER 310) - Credits: 10.00
Quality assurance 410 (BGC 410) - Credits: 16.00
Engineering economics 420 (BIE 420) - Credits: 8.00
Operational research 410 (BON 410) - Credits: 16.00
Project 410 (BPJ 410) - Credits: 16.00
Project 420 (BPJ 420) - Credits: 24.00
Practical training 410 (BPY 410) - Credits: 16.00
Management accounting 410 (BSR 410) - Credits: 16.00
Systems engineering 410 (BSS 410) - Credits: 16.00
Engineering professionalism 410 (IPI 410) - Credits: 8.00

BEng Mechanical Engineering (12130004)

Minimum duration of study 4 years

Programme information

All fields of study of the BEng degree have been accredited by the Engineering Council of South Africa (ECSA), and comply with the academic requirements for registration as a professional engineer. The programmes are designed in accordance with the outcomes-based model as required by the South African Qualifications Authority (SAQA). The learning outcomes and contents of the programmes have been compiled in accordance with the latest accreditation standards (PE-60 and PE-61) of ECSA, which also comply with the SAQA requirements, and which are summarised as follows:

Learning outcomes of the BEng degree:

A graduate in engineering should be able to apply the following skills on an advanced level:

- Engineering problem solving.
- Application of specialist and fundamental knowledge, with specific reference to mathematics, basic sciences

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- and engineering sciences.
 - c. Engineering design and synthesis.
 - d. Investigation, experimentation and data analysis.
 - e. Engineering methods, skills, tools and information technology.
 - f. Professional and general communication.
 - g. Awareness and knowledge of the impact of engineering activity on society and the physical environment.
 - h. Work in teams and in multidisciplinary environments.
 - i. An awareness and ability for lifelong learning.
 - j. An awareness and knowledge of principles of professional ethics and practice.
 - k. Awareness and knowledge of engineering management principles and economic decision-making.

Learning contents of the BEng programmes:

Six essential knowledge areas are included in the syllabi of the programmes. The typical representation of each knowledge area as a percentage of the total contents of an undergraduate programme is given in brackets () in the list below. This percentage varies for the different study directions, but conforms in all instances to the minimum knowledge area content as stipulated by ECSA.

Knowledge areas:

- a. Mathematics, including numerical methods and statistics (13%)
- b. Basic sciences: the natural sciences essential to the programme (15%)
- c. Engineering sciences (40%)
- d. Engineering design and synthesis (16%)
- e. Computing and information technology (5%)
- f. Complementary studies: communication, economy, management, innovation, environmental impact, ethics, engineering practice (11%).

Admission requirements

- The following persons will be considered for admission: candidates who are in possession of a certificate that is deemed by the University to be equivalent to the required Grade 12 certificate with university endorsement; candidates who are graduates from another tertiary institution or have been granted the status of a graduate of such an institution; and candidates who are graduates of another faculty at the University of Pretoria.
- Life Orientation is excluded when calculating the APS.
- Grade 11 results are used in the conditional admission of prospective students.
- A valid qualification with admission to degree studies is required.
- Minimum subject and achievement requirements, as set out below, are required.
- Conditional admission to the four-year programmes in the School of Engineering is only guaranteed if a prospective student complies with ALL the requirements below.
- **Note:** Candidates who do not comply with the minimum requirements, set out above, but who have obtained a minimum APS of 30, an achievement level of 5 for English, 6 for Mathematics and 5 for Physical Science, will be considered for conditional admission to either the four-year programme or the ENGAGE programme based on the results of the NBT.
- Admission to ENGAGE in the School of Engineering will be determined by the results of the NBT, NSC results, an achievement level of 5 in Mathematics and 5 in Physical Science, as well as an achievement level of 5 in English, together with an APS of 30.
- Students may apply directly to be considered for the ENGAGE programme.
- Tuition will be presented in English only.

Minimum requirements

Achievement level English Home Language or English First Additional Language		Mathematics		Physical Science		APS
NSC/IEB	AS Level	NSC/IEB	AS Level	NSC/IEB	AS Level	
5	C	6	B	6	B	35

* Cambridge A level candidates who obtained at least a D in the required subjects, will be considered for admission. International Baccalaureate (IB) HL candidates who obtained at least a 4 in the required subjects, will be considered for admission.

ENGAGE Programme minimum requirements						
Achievement level English Home Language or English First Additional Language		Mathematics		Physical Science		APS
NSC/IEB	AS Level	NSC/IEB	AS Level	NSC/IEB	AS Level	
5	C	5	C	5	C	30

Other programme-specific information

Please note: For the Aeronautical Option, the themes of both the Design and the Project must be aeronautical-related.

With a few exceptions, most modules offered at the School of Engineering are semester modules having credit values of either 8 or 16.

A student may be permitted by the Dean, on recommendation of the relevant head of department, to register for an equivalent module in an alternate semester, although the module is normally offered to the student’s group in another semester, and providing that no timetable clashes occur.

Please note:

1. All students are required to successfully complete JCP 203, Community-based project 203, as part of the requirements for the BEng degree. A student may register for the module during any of the years of study of the programme, but preferably not during the first or the final year of study.
2. Students registered for Chemical Engineering who have passed CBI 311 or CBI 410, receive credit for CBI 310.
3. Mechanical Engineering: For the Aeronautical Option, the themes of both the Design and the Project must be aeronautical-related.
4. Offering of electives depends on the availability of resources and industry support.

Promotion to next study year

Promotion to the second semester of the first year and to the second year of study (Eng. 14)

- a. A new first-year student who has failed in all the prescribed modules of the programme at the end of the first

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- semester, is excluded from studies in the School of Engineering. A student who is registered for the Engineering Augmented Degree Programme and has passed only 8 credits will also be excluded.
- b. A student who complies with all the requirements of the first year of study, is promoted to the second year of study.
 - c. A student who has not passed at least 70% of the credits of the first year of study after the November examinations, must reapply for admission should he/she intend to proceed with his/her studies. Application on the prescribed form must be submitted to the Student Administration of the School of Engineering not later than 11 January. Late applications will be accepted only in exceptional circumstances after approval by the Dean. Should first-year students be readmitted, conditions of readmission will be determined by the Admissions Committee.
 - d. Students who have not passed all the prescribed modules at first year level (level 100), as well as students who are readmitted in terms of Faculty Regulations must register for the outstanding first-year level (level-100) modules.
 - e. A student who is repeating his or her first year, may, on recommendation of the relevant heads of department and with the approval of the Dean, be permitted to enroll for modules of the second-year of study in addition to the first-year modules which he or she failed, providing that he or she complies with the prerequisites for the second-year modules and no timetable clashes occur. Students on the ENGAGE programme may, following the same procedure, be permitted to enrol for level-200 modules in addition to the level-100 modules which he/she failed providing that he/she complies with the prerequisites for the modules at 200-level and no timetable clashes occur. On recommendation of the relevant head of department and with special permission from the Dean, permission may be granted to exceed the prescribed number of credits. The total number of credits which may be approved may not exceed the normal number of credits per semester by more than 16 credits.
 - f. Students in Computer, Electrical and Electronic Engineering, who fail a first-year module for the second time, forfeit the privilege of registering for any modules of an advanced year of study.

Please note:

- i. From the second year of study each student should be in possession of an approved calculator. It is assumed that each student will have easy access to a laptop computer.
- ii. Students who intend transferring to Mining Engineering, must familiarise themselves with the stipulations set out in the syllabi of PWP 121 Workshop practice 121.

Promotion to the third year of study of the Four-year Programme, as well as to the third and the fourth years of study of the ENGAGE Programme. In case of the fourth year of study of the ENGAGE Programme, the words "first", "second" and "third" must be substituted with the words "second", "third" and "fourth" respectively. (Eng. 15)

- a. A student who complies with all the requirements of the second year of study, is promoted to the third year of study.
- b. A student must pass all the prescribed modules at first year level (level 100) before he or she is admitted to any module at third year level (level 300).
- c. A student who is repeating his or her second year must register for all the second-year modules still outstanding. Such a student may, on recommendation of the relevant head of department and with the approval of the Dean, be permitted to enroll for modules of the third year of study in addition to the second-year modules which he or she failed, providing that he or she complies with the prerequisites for the third-

year modules and no timetable clashes occur. On recommendation of the relevant head of department, and with special permission from the Dean, permission may be granted to exceed the prescribed number of credits. The total number of credits which may be approved may not exceed the normal number of credits per semester by more than 16 credits.

- d. Students in Computer, Electrical and Electronic Engineering who fail a second-year module for the second time forfeit the privilege of registering for any modules of the third year of study.
- e. Students who intend transferring to Mining Engineering must familiarise themselves with the stipulations set out in the syllabi of PWP 120 Workshop practice 120, as well as PPY 317 Practical training 317.

Promotion to the fourth year of study of the Four-year Programme, as well as to the fifth year of study of the ENGAGE Programme. In case of the fifth year of study of the ENGAGE Programme, the words "second", "third" and "fourth" must be substituted with the words "third", "fourth" and "fifth" respectively. (Eng. 16)

- a. A student who complies with all the requirements of the third year of study is promoted to the fourth year of study. A student who does not comply with all the requirements but who is able to register for all outstanding modules in order to complete the degree programme, may at registration be promoted to the fourth year of study.
- b. A student must pass all the prescribed modules of the second year of study, before he or she is admitted to any module of the fourth year of study.
- c. A student who has not passed all the prescribed modules of the third year of study, must register for the outstanding modules. A student may be admitted by the Dean, on the recommendation of the relevant head of department, to modules of the fourth year of study, in addition to the outstanding third-year modules, provided that he or she complies with the prerequisites of the fourth-year modules and no timetable clashes occur. The total number of credits per semester for which a student registers may not exceed the normal number of credits per semester by more than 16 credits. In exceptional cases, the Dean may, on recommendation of the relevant head of department, permit a student to exceed the above limit.
- d. Students in Computer, Electrical and Electronic Engineering who fail a third-year module for the second time, forfeit the privilege of registering for any modules of the fourth year of study.

Pass with distinction

- a. A student graduates with distinction if:
 - i. no module of the third or fourth year of study of the four year programme or of the fourth or fifth year of the ENGAGE programme was repeated and a weighted average of at least 75% was obtained in one year in all the modules of the final year of study; and
 - ii. the degree programme was completed within the prescribed four years for the four year programme and within the prescribed five years of the ENGAGE programme.
- b. Exceptional cases to the above will be considered by the Dean.

Curriculum: Year 1

Minimum credits: 150

Fundamental modules

Academic orientation 112 (UPO 112) - Credits: 0.00

Core modules

General chemistry 172 (CHM 172) - Credits: 16.00
Electricity and electronics 111 (EBN 111) - Credits: 16.00
Physics 116 (FSK 116) - Credits: 16.00
Humanities and social sciences 110 (HAS 110) - Credits: 8.00
Humanities and social sciences 120 (HAS 120) - Credits: 8.00
Graphical communication 110 (MGC 110) - Credits: 16.00
Materials science 123 (NMC 123) - Credits: 16.00
Mechanics 122 (SWK 122) - Credits: 16.00
Calculus 158 (WTW 158) - Credits: 16.00
Mathematics 164 (WTW 164) - Credits: 16.00
Workshop practice 121 (WWP 121) - Credits: 6.00

Curriculum: Year 2

Minimum credits: 144

Core modules

Engineering statistics 220 (BES 220) - Credits: 8.00
Community-based project 203 (JCP 203) - Credits: 8.00
Professional and technical communication 210 (MJJ 210) - Credits: 8.00
Manufacturing and design 217 (MOW 217) - Credits: 16.00
Structural design 227 (MOW 227) - Credits: 16.00
Programming and information technology 213 (MPR 213) - Credits: 16.00
Dynamics 210 (MSD 210) - Credits: 16.00
Thermodynamics 221 (MTX 221) - Credits: 16.00
Mathematics 238 (WTW 238) - Credits: 16.00
Differential equations 256 (WTW 256) - Credits: 8.00
Calculus 258 (WTW 258) - Credits: 8.00
Numerical methods 263 (WTW 263) - Credits: 8.00

Curriculum: Year 3

Minimum credits: 160

Core modules

Engineering management 310 (BSS 310) - Credits: 8.00
Electrical engineering 221 (EIR 221) - Credits: 16.00
Engineering activity and group work 320 (MIA 320) - Credits: 8.00
Solid mechanics 321 (MKM 321) - Credits: 16.00
Machine design 312 (MOW 312) - Credits: 16.00
Simulation-based design 323 (MOW 323) - Credits: 16.00
Practical training 315 (MPY 315) - Credits: 16.00
Structural mechanics 310 (MSY 310) - Credits: 16.00
Fluid mechanics 310 (MTV 310) - Credits: 16.00
Thermodynamics 311 (MTX 311) - Credits: 16.00
Vibration and noise 320 (MVR 320) - Credits: 16.00

Curriculum: Final year

Minimum credits: 160

Core modules

Engineering professionalism 410 (IPI 410) - Credits: 8.00
Control systems 410 (MBB 410) - Credits: 16.00
Computational fluid dynamics 411 (MKM 411) - Credits: 16.00
Design project 410 (MOX 410) - Credits: 16.00
Practical training 415 (MPY 415) - Credits: 16.00
Research project 412 (MRN 412) - Credits: 16.00
Research project 422 (MRN 422) - Credits: 24.00
Heat transfer 410 (MTV 410) - Credits: 16.00
Thermal and fluid machines 420 (MTV 420) - Credits: 16.00

Elective modules

Porous flow 420 (MAN 420) - Credits: 16.00
Mechatronics 421 (MEG 421) - Credits: 16.00
Heat and mass transfer 420 (MHM 420) - Credits: 16.00
Maintenance engineering 420 (MII 420) - Credits: 16.00
Nuclear engineering 420 (MKI 420) - Credits: 16.00
Aeronautics 420 (MLV 420) - Credits: 16.00
Optimum design 420 (MOO 420) - Credits: 16.00
Fossil fuel power stations 420 (MUU 420) - Credits: 16.00
Vehicle engineering 420 (MVE 420) - Credits: 16.00
Numerical methods 420 (MWN 420) - Credits: 16.00

BEng Mechanical Engineering ENGAGE (12136004)

Minimum duration of study 5 years

Programme information

Please note: The Engineering Augmented Degree Programme (ENGAGE) is an extended degree programme with a five-year curriculum. It is designed to enable students who show academic potential but who do not meet the normal entry requirements for the four-year degree programme, to obtain an Engineering degree. ENGAGE students spend the first three years of the programme covering the content of the first two years of the four-year degree programme. They also take compulsory augmented modules in each of the Level 1 subjects. These augmented modules provide students with background knowledge and skills needed to succeed in an engineering degree. The curriculum for years four and five of the ENGAGE programme are identical to the curriculum for years 3 and 4 of the 4-year programme, respectively. Students may apply directly for admission to the programme.

- Students must register for the entire programme, not components of it. The curriculum is fixed; there are no electives.
- Attendance at all components of years 1 to 3 of the programme is compulsory. Non-attendance will only be condoned in the case of illness (sick note required) or family crisis (e.g. a death in the family), in which case students must inform the programme administration immediately.
- Students who fail to meet the attendance requirement for any module in any semester of years 1 to 3 of the programme will be excluded from the programme.
- No augmented module may be repeated more than once.
- Selection into the programme will be based on a combination of performance in the National Senior Certificate

examinations or equivalent and other selection tests approved by the faculty.

- A student who fails a mainstream module (e.g. Chemistry) but passes the associated augmented module (e.g. Additional chemistry) does not need to repeat the augmented module.
 - A student who fails an augmented module (e.g. Additional chemistry) but passes the associated mainstream module (e.g. Chemistry) does not need to repeat the mainstream module.
 - A student must meet the attendance requirement and obtain at least 40% for both the continuous assessment and test components as well as a final mark of 50% in order to pass an augmented module.
- i. The curricula of the fourth and the fifth years of study are identical to those of the third and the fourth years of the four-year programme.
 - ii. JPO 110 is a prerequisite for JPO 120. Credit for JPO is obtained with a final mark of more than 50%.
Conditional admission to JPO 120: If the final mark for JPO 110 is between 45% and 49%, a student can register for JPO 120 but credit for JPO 110 and JPO 120 will only be obtained if the final combined mark for JPO 110 and JPO 120 is above 50%.

Please note: All students will be required to successfully complete JCP 203, Community-based project 203, as part of the requirements for the BEng degree. A student may register for the module during any of the years of study of the programme, but preferably not during the first or the final year of study.

Learning outcomes of the BEng degree:

A graduate in engineering should be able to apply the following skills on an advanced level:

- a. Engineering problem solving.
- b. Application of specialist and fundamental knowledge, with specific reference to mathematics, basic sciences and engineering sciences.
- c. Engineering design and synthesis.
- d. Investigation, experimentation and data analysis.
- e. Engineering methods, skills, tools and information technology.
- f. Professional and general communication.
- g. Awareness and knowledge of the impact of engineering activity on society and the physical environment.
- h. Work in teams and in multidisciplinary environments.
- i. An awareness and ability for lifelong learning.
- j. An awareness and knowledge of principles of professional ethics and practice.
- k. Awareness and knowledge of engineering management principles and economic decision-making.

Learning contents of the BEng programmes:

Six essential knowledge areas are included in the syllabi of the programmes. The typical representation of each knowledge area as a percentage of the total contents of an undergraduate programme is given in brackets () in the list below. This percentage varies for the different study directions, but conforms in all instances to the minimum knowledge area content as stipulated by ECSA.

Knowledge areas:

- a. Mathematics, including numerical methods and statistics (13%)
- b. Basic sciences: the natural sciences essential to the programme (15%)
- c. Engineering sciences (40%)
- d. Engineering design and synthesis (16%)
- e. Computing and information technology (5%)
- f. Complementary studies: communication, economy, management, innovation, environmental impact, ethics, engineering practice (11%).

Promotion to next study year

Promotion to the second semester of the first year and to the second year of study (Eng. 14)

- a. A new first-year student who has failed in all the prescribed modules of the programme at the end of the first semester, is excluded from studies in the School of Engineering. A student who is registered for the Engineering Augmented Degree Programme and has passed only 8 credits will also be excluded.
- b. A student who complies with all the requirements of the first year of study, is promoted to the second year of study.
- c. A student who has not passed at least 70% of the credits of the first year of study after the November examinations, must reapply for admission should he/she intend to proceed with his/her studies. Application on the prescribed form must be submitted to the Student Administration of the School of Engineering not later than 11 January. Late applications will be accepted only in exceptional circumstances after approval by the Dean. Should first-year students be readmitted, conditions of readmission will be determined by the Admissions Committee.
- d. Students who have not passed all the prescribed modules at first year level (level 100), as well as students who are readmitted in terms of Faculty Regulations must register for the outstanding first-year level (level-100) modules.
- e. A student who is repeating his or her first year, may, on recommendation of the relevant heads of department and with the approval of the Dean, be permitted to enroll for modules of the second-year of study in addition to the first-year modules which he or she failed, providing that he or she complies with the prerequisites for the second-year modules and no timetable clashes occur. Students on the ENGAGE programme may, following the same procedure, be permitted to enrol for level-200 modules in addition to the level-100 modules which he/she failed providing that he/she complies with the prerequisites for the modules at 200-level and no timetable clashes occur. On recommendation of the relevant head of department and with special permission from the Dean, permission may be granted to exceed the prescribed number of credits. The total number of credits which may be approved may not exceed the normal number of credits per semester by more than 16 credits.
- f. Students in Computer, Electrical and Electronic Engineering, who fail a first-year module for the second time, forfeit the privilege of registering for any modules of an advanced year of study.

Please note:

- i. From the second year of study each student should be in possession of an approved calculator. It is assumed that each student will have easy access to a laptop computer.
- ii. Students who intend transferring to Mining Engineering, must familiarise themselves with the stipulations set out in the syllabi of PWP 121 Workshop practice 121.

Promotion to the third year of study of the Four-year Programme, as well as to the third and the fourth years of study of the ENGAGE Programme. In case of the fourth year of study of the ENGAGE Programme, the words "first", "second" and "third" must be substituted with the words "second", "third" and "fourth" respectively. (Eng. 15)

- a. A student who complies with all the requirements of the second year of study, is promoted to the third year of study.
- b. A student must pass all the prescribed modules at first year level (level 100) before he or she is admitted to any module at third year level (level 300).
- c. A student who is repeating his or her second year must register for all the second-year modules still

outstanding. Such a student may, on recommendation of the relevant head of department and with the approval of the Dean, be permitted to enroll for modules of the third year of study in addition to the second-year modules which he or she failed, providing that he or she complies with the prerequisites for the third-year modules and no timetable clashes occur. On recommendation of the relevant head of department, and with special permission from the Dean, permission may be granted to exceed the prescribed number of credits. The total number of credits which may be approved may not exceed the normal number of credits per semester by more than 16 credits.

- d. Students in Computer, Electrical and Electronic Engineering who fail a second-year module for the second time forfeit the privilege of registering for any modules of the third year of study.
- e. Students who intend transferring to Mining Engineering must familiarise themselves with the stipulations set out in the syllabi of PWP 120 Workshop practice 120, as well as PPY 317 Practical training 317.

Promotion to the fourth year of study of the Four-year Programme, as well as to the fifth year of study of the ENGAGE Programme. In case of the fifth year of study of the ENGAGE Programme, the words "second", "third" and "fourth" must be substituted with the words "third", "fourth" and "fifth" respectively. (Eng. 16)

- a. A student who complies with all the requirements of the third year of study is promoted to the fourth year of study. A student who does not comply with all the requirements but who is able to register for all outstanding modules in order to complete the degree programme, may at registration be promoted to the fourth year of study.
- b. A student must pass all the prescribed modules of the second year of study, before he or she is admitted to any module of the fourth year of study.
- c. A student who has not passed all the prescribed modules of the third year of study, must register for the outstanding modules. A student may be admitted by the Dean, on the recommendation of the relevant head of department, to modules of the fourth year of study, in addition to the outstanding third-year modules, provided that he or she complies with the prerequisites of the fourth-year modules and no timetable clashes occur. The total number of credits per semester for which a student registers may not exceed the normal number of credits per semester by more than 16 credits. In exceptional cases, the Dean may, on recommendation of the relevant head of department, permit a student to exceed the above limit.
- d. Students in Computer, Electrical and Electronic Engineering who fail a third-year module for the second time, forfeit the privilege of registering for any modules of the fourth year of study.

Pass with distinction

- a. A student graduates with distinction if:
 - i. no module of the third or fourth year of study of the four year programme or of the fourth or fifth year of the ENGAGE programme was repeated and a weighted average of at least 75% was obtained in one year in all the modules of the final year of study; and
 - ii. the degree programme was completed within the prescribed four years for the four year programme and within the prescribed five years of the ENGAGE programme.
- b. Exceptional cases to the above will be considered by the Dean.

Curriculum: Year 1

Minimum credits: 134

Fundamental modules

Academic orientation 112 (UPO 112) - Credits: 0.00

Core modules

General chemistry 172 (CHM 172) - Credits: 16.00

Physics 116 (FSK 116) - Credits: 16.00

Humanities and social sciences 110 (HAS 110) - Credits: 8.00

Humanities and social sciences 120 (HAS 120) - Credits: 8.00

Professional orientation 110 (JPO 110) - Credits: 8.00

Additional Mathematics 1 116 (JPO 116) - Credits: 8.00

Professional orientation 120 (JPO 120) - Credits: 8.00

Additional Mathematics 2 126 (JPO 126) - Credits: 8.00

Additional Physics 152 (JPO 152) - Credits: 8.00

Additional Chemistry 1 161 (JPO 161) - Credits: 8.00

Calculus 158 (WTW 158) - Credits: 16.00

Mathematics 164 (WTW 164) - Credits: 16.00

Workshop practice 121 (WWP 121) - Credits: 6.00

Curriculum: Year 2

Minimum credits: 120

Core modules

Electricity and electronics 111 (EBN 111) - Credits: 16.00

Community-based project 203 (JCP 203) - Credits: 8.00

Additional Electricity and electronics 112 (JPO 112) - Credits: 8.00

Additional Graphical communication 113 (JPO 113) - Credits: 8.00

Additional Materials science 123 (JPO 123) - Credits: 8.00

Additional Mechanics 125 (JPO 125) - Credits: 8.00

Graphical communication 110 (MGC 110) - Credits: 16.00

Materials science 123 (NMC 123) - Credits: 16.00

Mechanics 122 (SWK 122) - Credits: 16.00

Calculus 258 (WTW 258) - Credits: 8.00

Numerical methods 263 (WTW 263) - Credits: 8.00

Curriculum: Year 3

Minimum credits: 120

Core modules

Engineering statistics 220 (BES 220) - Credits: 8.00

Professional and technical communication 210 (MJJ 210) - Credits: 8.00

Manufacturing and design 217 (MOW 217) - Credits: 16.00

Structural design 227 (MOW 227) - Credits: 16.00

Programming and information technology 213 (MPR 213) - Credits: 16.00

Dynamics 210 (MSD 210) - Credits: 16.00

Thermodynamics 221 (MTX 221) - Credits: 16.00

Mathematics 238 (WTW 238) - Credits: 16.00

Differential equations 256 (WTW 256) - Credits: 8.00

Curriculum: Year 4

Minimum credits: 160

Core modules

Engineering management 310 (BSS 310) - Credits: 8.00
Electrical engineering 221 (EIR 221) - Credits: 16.00
Engineering activity and group work 320 (MIA 320) - Credits: 8.00
Solid mechanics 321 (MKM 321) - Credits: 16.00
Machine design 312 (MOW 312) - Credits: 16.00
Simulation-based design 323 (MOW 323) - Credits: 16.00
Practical training 315 (MPY 315) - Credits: 16.00
Structural mechanics 310 (MSY 310) - Credits: 16.00
Fluid mechanics 310 (MTV 310) - Credits: 16.00
Thermodynamics 311 (MTX 311) - Credits: 16.00
Vibration and noise 320 (MVR 320) - Credits: 16.00

Curriculum: Final year

Minimum credits: 176

Core modules

Engineering professionalism 410 (IPI 410) - Credits: 8.00
Control systems 410 (MBB 410) - Credits: 16.00
Computational fluid dynamics 411 (MKM 411) - Credits: 16.00
Aeronautics 420 (MLV 420) - Credits: 16.00
Design project 410 (MOX 410) - Credits: 16.00
Practical training 415 (MPY 415) - Credits: 16.00
Research project 412 (MRN 412) - Credits: 16.00
Research project 422 (MRN 422) - Credits: 24.00
Heat transfer 410 (MTV 410) - Credits: 16.00
Thermal and fluid machines 420 (MTV 420) - Credits: 16.00

Elective modules

Porous flow 420 (MAN 420) - Credits: 16.00
Mechatronics 421 (MEG 421) - Credits: 16.00
Heat and mass transfer 420 (MHM 420) - Credits: 16.00
Maintenance engineering 420 (MII 420) - Credits: 16.00
Nuclear engineering 420 (MKI 420) - Credits: 16.00
Aeronautics 420 (MLV 420) - Credits: 16.00
Optimum design 420 (MOO 420) - Credits: 16.00
Fossil fuel power stations 420 (MUU 420) - Credits: 16.00
Vehicle engineering 420 (MVE 420) - Credits: 16.00

BEng Metallurgical Engineering (12130005)

Minimum duration of study 4 years

Programme information

All fields of study of the BEng degree have been accredited by the Engineering Council of South Africa (ECSA),

and comply with the academic requirements for registration as a professional engineer. The programmes are designed in accordance with the outcomes-based model as required by the South African Qualifications Authority (SAQA). The learning outcomes and contents of the programmes have been compiled in accordance with the latest accreditation standards (PE-60 and PE-61) of ECSA, which also comply with the SAQA requirements, and which are summarised as follows:

Learning outcomes of the BEng degree:

A graduate in engineering should be able to apply the following skills on an advanced level:

- a. Engineering problem solving.
- b. Application of specialist and fundamental knowledge, with specific reference to mathematics, basic sciences and engineering sciences.
- c. Engineering design and synthesis.
- d. Investigation, experimentation and data analysis.
- e. Engineering methods, skills, tools and information technology.
- f. Professional and general communication.
- g. Awareness and knowledge of the impact of engineering activity on society and the physical environment.
- h. Work in teams and in multidisciplinary environments.
 - i. An awareness and ability for lifelong learning.
 - j. An awareness and knowledge of principles of professional ethics and practice.
- k. Awareness and knowledge of engineering management principles and economic decision-making.

Learning contents of the BEng programmes:

Six essential knowledge areas are included in the syllabi of the programmes. The typical representation of each knowledge area as a percentage of the total contents of an undergraduate programme is given in brackets () in the list below. This percentage varies for the different study directions, but conforms in all instances to the minimum knowledge area content as stipulated by ECSA.

Knowledge areas:

- a. Mathematics, including numerical methods and statistics (13%)
- b. Basic sciences: the natural sciences essential to the programme (15%)
- c. Engineering sciences (40%)
- d. Engineering design and synthesis (16%)
- e. Computing and information technology (5%)
- f. Complementary studies: communication, economy, management, innovation, environmental impact, ethics, engineering practice (11%).

Admission requirements

- The following persons will be considered for admission: candidates who are in possession of a certificate that is deemed by the University to be equivalent to the required Grade 12 certificate with university endorsement; candidates who are graduates from another tertiary institution or have been granted the status of a graduate of such an institution; and candidates who are graduates of another faculty at the University of Pretoria.
- Life Orientation is excluded when calculating the APS.
- Grade 11 results are used in the conditional admission of prospective students.
- A valid qualification with admission to degree studies is required.
- Minimum subject and achievement requirements, as set out below, are required.
- Conditional admission to the four-year programmes in the School of Engineering is only guaranteed if a prospective student complies with ALL the requirements below.

- **Note:** Candidates who do not comply with the minimum requirements, set out above, but who have obtained a minimum APS of 30, an achievement level of 5 for English, 6 for Mathematics and 5 for Physical Science, will be considered for conditional admission to either the four-year programme or the ENGAGE programme based on the results of the NBT.
- Admission to ENGAGE in the School of Engineering will be determined by the results of the NBT, NSC results, an achievement level of 5 in Mathematics and 5 in Physical Science, as well as an achievement level of 5 in English, together with an APS of 30.
- Students may apply directly to be considered for the ENGAGE programme.
- Tuition will be presented in English only.

Minimum requirements

Achievement level

English Home

Language or

English First

Additional

Language

		Mathematics		Physical Science		APS
NSC/IEB	AS Level	NSC/IEB	AS Level	NSC/IEB	AS Level	
5	C	6	B	6	B	35

* Cambridge A level candidates who obtained at least a D in the required subjects, will be considered for admission. International Baccalaureate (IB) HL candidates who obtained at least a 4 in the required subjects, will be considered for admission.

ENGAGE Programme minimum requirements

Achievement level

English Home

Language or

English First

Additional

Language

		Mathematics		Physical Science		APS
NSC/IEB	AS Level	NSC/IEB	AS Level	NSC/IEB	AS Level	
5	C	5	C	5	C	30

Other programme-specific information

With a few exceptions, most modules offered at the School of Engineering are semester modules having credit values of either 8 or 16.

A student may be permitted by the Dean, on recommendation of the relevant head of department, to register for an equivalent module in an alternate semester, although the module is normally offered to the student's group in another semester, and providing that no timetable clashes occur.

Please note:

1. All students are required to successfully complete JCP 203, Community-based project 203, as part of the requirements for the BEng degree. A student may register for the module during any of the years of study of the programme, but preferably not during the first or the final year of study.
2. Students registered for Chemical Engineering who have passed CBI 311 or CBI 410, receive credit for CBI 310.

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3. Mechanical Engineering: For the Aeronautical Option, the themes of both the Design and the Project must be aeronautical-related.
 4. Offering of electives depends on the availability of resources and industry support.

Promotion to next study year

Promotion to the second semester of the first year and to the second year of study (Eng. 14)

- a. A new first-year student who has failed in all the prescribed modules of the programme at the end of the first semester, is excluded from studies in the School of Engineering. A student who is registered for the Engineering Augmented Degree Programme and has passed only 8 credits will also be excluded.
- b. A student who complies with all the requirements of the first year of study, is promoted to the second year of study.
- c. A student who has not passed at least 70% of the credits of the first year of study after the November examinations, must reapply for admission should he/she intend to proceed with his/her studies. Application on the prescribed form must be submitted to the Student Administration of the School of Engineering not later than 11 January. Late applications will be accepted only in exceptional circumstances after approval by the Dean. Should first-year students be readmitted, conditions of readmission will be determined by the Admissions Committee.
- d. Students who have not passed all the prescribed modules at first year level (level 100), as well as students who are readmitted in terms of Faculty Regulations must register for the outstanding first-year level (level-100) modules.
- e. A student who is repeating his or her first year, may, on recommendation of the relevant heads of department and with the approval of the Dean, be permitted to enroll for modules of the second-year of study in addition to the first-year modules which he or she failed, providing that he or she complies with the prerequisites for the second-year modules and no timetable clashes occur. Students on the ENGAGE programme may, following the same procedure, be permitted to enrol for level-200 modules in addition to the level-100 modules which he/she failed providing that he/she complies with the prerequisites for the modules at 200-level and no timetable clashes occur. On recommendation of the relevant head of department and with special permission from the Dean, permission may be granted to exceed the prescribed number of credits. The total number of credits which may be approved may not exceed the normal number of credits per semester by more than 16 credits.
- f. Students in Computer, Electrical and Electronic Engineering, who fail a first-year module for the second time, forfeit the privilege of registering for any modules of an advanced year of study.

Please note:

- i. From the second year of study each student should be in possession of an approved calculator. It is assumed that each student will have easy access to a laptop computer.
- ii. Students who intend transferring to Mining Engineering, must familiarise themselves with the stipulations set out in the syllabi of PWP 121 Workshop practice 121.

Promotion to the third year of study of the Four-year Programme, as well as to the third and the fourth years of study of the ENGAGE Programme. In case of the fourth year of study of the ENGAGE Programme, the words "first", "second" and "third" must be substituted with the words "second", "third" and "fourth" respectively. (Eng. 15)

- a. A student who complies with all the requirements of the second year of study, is promoted to the third year

of study.

- b. A student must pass all the prescribed modules at first year level (level 100) before he or she is admitted to any module at third year level (level 300).
- c. A student who is repeating his or her second year must register for all the second-year modules still outstanding. Such a student may, on recommendation of the relevant head of department and with the approval of the Dean, be permitted to enroll for modules of the third year of study in addition to the second-year modules which he or she failed, providing that he or she complies with the prerequisites for the third-year modules and no timetable clashes occur. On recommendation of the relevant head of department, and with special permission from the Dean, permission may be granted to exceed the prescribed number of credits. The total number of credits which may be approved may not exceed the normal number of credits per semester by more than 16 credits.
- d. Students in Computer, Electrical and Electronic Engineering who fail a second-year module for the second time forfeit the privilege of registering for any modules of the third year of study.
- e. Students who intend transferring to Mining Engineering must familiarise themselves with the stipulations set out in the syllabi of PWP 120 Workshop practice 120, as well as PPY 317 Practical training 317.

Promotion to the fourth year of study of the Four-year Programme, as well as to the fifth year of study of the ENGAGE Programme. In case of the fifth year of study of the ENGAGE Programme, the words "second", "third" and "fourth" must be substituted with the words "third", "fourth" and "fifth" respectively. (Eng. 16)

- a. A student who complies with all the requirements of the third year of study is promoted to the fourth year of study. A student who does not comply with all the requirements but who is able to register for all outstanding modules in order to complete the degree programme, may at registration be promoted to the fourth year of study.
- b. A student must pass all the prescribed modules of the second year of study, before he or she is admitted to any module of the fourth year of study.
- c. A student who has not passed all the prescribed modules of the third year of study, must register for the outstanding modules. A student may be admitted by the Dean, on the recommendation of the relevant head of department, to modules of the fourth year of study, in addition to the outstanding third-year modules, provided that he or she complies with the prerequisites of the fourth-year modules and no timetable clashes occur. The total number of credits per semester for which a student registers may not exceed the normal number of credits per semester by more than 16 credits. In exceptional cases, the Dean may, on recommendation of the relevant head of department, permit a student to exceed the above limit.
- d. Students in Computer, Electrical and Electronic Engineering who fail a third-year module for the second time, forfeit the privilege of registering for any modules of the fourth year of study.

Pass with distinction

- a. A student graduates with distinction if:
 - i. no module of the third or fourth year of study of the four year programme or of the fourth or fifth year of the ENGAGE programme was repeated and a weighted average of at least 75% was obtained in one year in all the modules of the final year of study; and
 - ii. the degree programme was completed within the prescribed four years for the four year programme and within the prescribed five years of the ENGAGE programme.

b. Exceptional cases to the above will be considered by the Dean.

Curriculum: Year 1

Minimum credits: 144

Fundamental modules

Academic orientation 112 (UPO 112) - Credits: 0.00

Core modules

General chemistry 171 (CHM 171) - Credits: 16.00

Electricity and electronics 122 (EBN 122) - Credits: 16.00

Physics 176 (FSK 176) - Credits: 16.00

Humanities and social sciences 110 (HAS 110) - Credits: 8.00

Humanities and social sciences 120 (HAS 120) - Credits: 8.00

Graphical communication 110 (MGC 110) - Credits: 16.00

Materials science 113 (NMC 113) - Credits: 16.00

Mechanics 122 (SWK 122) - Credits: 16.00

Calculus 158 (WTW 158) - Credits: 16.00

Mathematics 164 (WTW 164) - Credits: 16.00

Workshop practice 121 (WWP 121) - Credits: 6.00

Curriculum: Year 2

Minimum credits: 162

Students are required to register for NTC210 as well.

Core modules

Engineering statistics 220 (BES 220) - Credits: 8.00

Electrical engineering 221 (EIR 221) - Credits: 16.00

Mineralogy 210 (GMI 210) - Credits: 16.00

Community-based project 203 (JCP 203) - Credits: 8.00

Programming and information technology 213 (MPR 213) - Credits: 16.00

Dynamics 210 (MSD 210) - Credits: 16.00

Professional and technical communication 210 (NJJ 210) - Credits: 8.00

Materials science 223 (NMC 223) - Credits: 16.00

Process thermodynamics 220 (NPT 220) - Credits: 16.00

Metallurgical calculations 210 (NTC 210) - Credits: 8.00

Mathematics 238 (WTW 238) - Credits: 16.00

Differential equations 256 (WTW 256) - Credits: 8.00

Calculus 258 (WTW 258) - Credits: 8.00

Numerical methods 263 (WTW 263) - Credits: 8.00

Curriculum: Year 3

Minimum credits: 144

Students are required to register for NTV310 and NPB312.

Students who failed NEC310 and NEX320 in 2019 will be allowed to repeat it in 2020 for the final time.

Core modules

Engineering management 310 (BSS 310) - Credits: 8.00
Engineering activity and group work 320 (MIA 320) - Credits: 8.00
Electrochemistry 310 (NEC 310) - Credits: 16.00
Excursions 320 (NEX 320) - Credits: 8.00
Hydrometallurgy 322 (NHM 322) - Credits: 16.00
Materials science 313 (NMC 313) - Credits: 16.00
Mechanical metallurgy 320 (NMM 320) - Credits: 16.00
Minerals processing 310 (NMP 310) - Credits: 16.00
Process heat transfer and control 312 (NPB 312) - Credits: 16.00
Pyrometallurgy 321 (NPM 321) - Credits: 16.00
Industrial training 316 (NPY 316) - Credits: 16.00
Metallurgical fluid mechanics 310 (NTV 310) - Credits: 8.00
Refractory materials 321 (NVM 321) - Credits: 8.00

Curriculum: Final year

Minimum credits: 136

Students who failed NPB412 in 2019 will be allowed to repeat it in 2020 for the final time.

Core modules

Engineering professionalism 410 (IPI 410) - Credits: 8.00
Hydrometallurgy 412 (NHM 412) - Credits: 16.00
Minerals processing 411 (NMP 411) - Credits: 16.00
Process design 421 (NOP 421) - Credits: 32.00
Process metallurgy and control 412 (NPB 412) - Credits: 8.00
Metals processing 411 (NPW 411) - Credits: 16.00
Industrial training 416 (NPY 416) - Credits: 16.00
Literature survey and research planning 412 (NSC 412) - Credits: 8.00
Project 422 (NSC 422) - Credits: 32.00

BEng Metallurgical Engineering ENGAGE (12136005)

Minimum duration of study 5 years

Programme information

Please note: The Engineering Augmented Degree Programme (ENGAGE) is an extended degree programme with a five-year curriculum. It is designed to enable students who show academic potential but who do not meet the normal entry requirements for the four-year degree programme, to obtain an Engineering degree. ENGAGE students spend the first three years of the programme covering the content of the first two years of the four-year degree programme. They also take compulsory augmented modules in each of the Level 1 subjects. These augmented modules provide students with background knowledge and skills needed to succeed in an engineering degree. The curriculum for years four and five of the ENGAGE programme are identical to the curriculum for years 3 and 4 of the 4-year programme, respectively. Students may apply directly for admission to the programme.

- Students must register for the entire programme, not components of it. The curriculum is fixed; there are no electives.

- Attendance at all components of years 1 to 3 of the programme is compulsory. Non-attendance will only be condoned in the case of illness (sick note required) or family crisis (e.g. a death in the family), in which case students must inform the programme administration immediately.
- Students who fail to meet the attendance requirement for any module in any semester of years 1 to 3 of the programme will be excluded from the programme.
- No augmented module may be repeated more than once.
- Selection into the programme will be based on a combination of performance in the National Senior Certificate examinations or equivalent and other selection tests approved by the faculty.
- A student who fails a mainstream module (e.g. Chemistry) but passes the associated augmented module (e.g. Additional chemistry) does not need to repeat the augmented module.
- A student who fails an augmented module (e.g. Additional chemistry) but passes the associated mainstream module (e.g. Chemistry) does not need to repeat the mainstream module.
- A student must meet the attendance requirement and obtain at least 40% for both the continuous assessment and test components as well as a final mark of 50% in order to pass an augmented module.
- i. The curricula of the fourth and the fifth years of study are identical to those of the third and the fourth years of the four-year programme.
- ii. JPO 110 is a prerequisite for JPO 120. Credit for JPO is obtained with a final mark of more than 50%.
Conditional admission to JPO 120: If the final mark for JPO 110 is between 45% and 49%, a student can register for JPO 120 but credit for JPO 110 and JPO 120 will only be obtained if the final combined mark for JPO 110 and JPO 120 is above 50%.

Please note: All students will be required to successfully complete JCP 203, Community-based project 203, as part of the requirements for the BEng degree. A student may register for the module during any of the years of study of the programme, but preferably not during the first or the final year of study.

Learning outcomes of the BEng degree:

A graduate in engineering should be able to apply the following skills on an advanced level:

- Engineering problem solving.
- Application of specialist and fundamental knowledge, with specific reference to mathematics, basic sciences and engineering sciences.
- Engineering design and synthesis.
- Investigation, experimentation and data analysis.
- Engineering methods, skills, tools and information technology.
- Professional and general communication.
- Awareness and knowledge of the impact of engineering activity on society and the physical environment.
- Work in teams and in multidisciplinary environments.
- An awareness and ability for lifelong learning.
- An awareness and knowledge of principles of professional ethics and practice.
- Awareness and knowledge of engineering management principles and economic decision-making.

Learning contents of the BEng programmes:

Six essential knowledge areas are included in the syllabi of the programmes. The typical representation of each knowledge area as a percentage of the total contents of an undergraduate programme is given in brackets () in the list below. This percentage varies for the different study directions, but conforms in all instances to the minimum knowledge area content as stipulated by ECSA.

Knowledge areas:

- Mathematics, including numerical methods and statistics (13%)

-
- b. Basic sciences: the natural sciences essential to the programme (15%)
 - c. Engineering sciences (40%)
 - d. Engineering design and synthesis (16%)
 - e. Computing and information technology (5%)
 - f. Complementary studies: communication, economy, management, innovation, environmental impact, ethics, engineering practice (11%).

Promotion to next study year

Promotion to the second semester of the first year and to the second year of study (Eng. 14)

- a. A new first-year student who has failed in all the prescribed modules of the programme at the end of the first semester, is excluded from studies in the School of Engineering. A student who is registered for the Engineering Augmented Degree Programme and has passed only 8 credits will also be excluded.
- b. A student who complies with all the requirements of the first year of study, is promoted to the second year of study.
- c. A student who has not passed at least 70% of the credits of the first year of study after the November examinations, must reapply for admission should he/she intend to proceed with his/her studies. Application on the prescribed form must be submitted to the Student Administration of the School of Engineering not later than 11 January. Late applications will be accepted only in exceptional circumstances after approval by the Dean. Should first-year students be readmitted, conditions of readmission will be determined by the Admissions Committee.
- d. Students who have not passed all the prescribed modules at first year level (level 100), as well as students who are readmitted in terms of Faculty Regulations must register for the outstanding first-year level (level-100) modules.
- e. A student who is repeating his or her first year, may, on recommendation of the relevant heads of department and with the approval of the Dean, be permitted to enroll for modules of the second-year of study in addition to the first-year modules which he or she failed, providing that he or she complies with the prerequisites for the second-year modules and no timetable clashes occur. Students on the ENGAGE programme may, following the same procedure, be permitted to enrol for level-200 modules in addition to the level-100 modules which he/she failed providing that he/she complies with the prerequisites for the modules at 200-level and no timetable clashes occur. On recommendation of the relevant head of department and with special permission from the Dean, permission may be granted to exceed the prescribed number of credits. The total number of credits which may be approved may not exceed the normal number of credits per semester by more than 16 credits.
- f. Students in Computer, Electrical and Electronic Engineering, who fail a first-year module for the second time, forfeit the privilege of registering for any modules of an advanced year of study.

Please note:

- i. From the second year of study each student should be in possession of an approved calculator. It is assumed that each student will have easy access to a laptop computer.
- ii. Students who intend transferring to Mining Engineering, must familiarise themselves with the stipulations set out in the syllabi of PWP 121 Workshop practice 121.

Promotion to the third year of study of the Four-year Programme, as well as to the third and the fourth years of study of the ENGAGE Programme. In case of the fourth year of study of the ENGAGE

Programme, the words "first", "second" and "third" must be substituted with the words "second", "third" and "fourth" respectively. (Eng. 15)

- a. A student who complies with all the requirements of the second year of study, is promoted to the third year of study.
- b. A student must pass all the prescribed modules at first year level (level 100) before he or she is admitted to any module at third year level (level 300).
- c. A student who is repeating his or her second year must register for all the second-year modules still outstanding. Such a student may, on recommendation of the relevant head of department and with the approval of the Dean, be permitted to enroll for modules of the third year of study in addition to the second-year modules which he or she failed, providing that he or she complies with the prerequisites for the third-year modules and no timetable clashes occur. On recommendation of the relevant head of department, and with special permission from the Dean, permission may be granted to exceed the prescribed number of credits. The total number of credits which may be approved may not exceed the normal number of credits per semester by more than 16 credits.
- d. Students in Computer, Electrical and Electronic Engineering who fail a second-year module for the second time forfeit the privilege of registering for any modules of the third year of study.
- e. Students who intend transferring to Mining Engineering must familiarise themselves with the stipulations set out in the syllabi of PWP 120 Workshop practice 120, as well as PPY 317 Practical training 317.

Promotion to the fourth year of study of the Four-year Programme, as well as to the fifth year of study of the ENGAGE Programme. In case of the fifth year of study of the ENGAGE Programme, the words "second", "third" and "fourth" must be substituted with the words "third", "fourth" and "fifth" respectively. (Eng. 16)

- a. A student who complies with all the requirements of the third year of study is promoted to the fourth year of study. A student who does not comply with all the requirements but who is able to register for all outstanding modules in order to complete the degree programme, may at registration be promoted to the fourth year of study.
- b. A student must pass all the prescribed modules of the second year of study, before he or she is admitted to any module of the fourth year of study.
- c. A student who has not passed all the prescribed modules of the third year of study, must register for the outstanding modules. A student may be admitted by the Dean, on the recommendation of the relevant head of department, to modules of the fourth year of study, in addition to the outstanding third-year modules, provided that he or she complies with the prerequisites of the fourth-year modules and no timetable clashes occur. The total number of credits per semester for which a student registers may not exceed the normal number of credits per semester by more than 16 credits. In exceptional cases, the Dean may, on recommendation of the relevant head of department, permit a student to exceed the above limit.
- d. Students in Computer, Electrical and Electronic Engineering who fail a third-year module for the second time, forfeit the privilege of registering for any modules of the fourth year of study.

Pass with distinction

- a. A student graduates with distinction if:
 - i. no module of the third or fourth year of study of the four year programme or of the fourth or fifth year of the ENGAGE programme was repeated and a weighted average of at least 75% was obtained in one year in all the

-
- modules of the final year of study; and
- ii. the degree programme was completed within the prescribed four years for the four year programme and within the prescribed five years of the ENGAGE programme.
- b. Exceptional cases to the above will be considered by the Dean.

Curriculum: Year 1

Minimum credits: 128

Fundamental modules

[Academic orientation 112](#) (UPO 112) - Credits: 0.00

Core modules

[General chemistry 171](#) (CHM 171) - Credits: 16.00

[Physics 176](#) (FSK 176) - Credits: 16.00

[Humanities and social sciences 110](#) (HAS 110) - Credits: 8.00

[Humanities and social sciences 120](#) (HAS 120) - Credits: 8.00

[Professional orientation 110](#) (JPO 110) - Credits: 8.00

[Additional Chemistry 1 111](#) (JPO 111) - Credits: 8.00

[Additional Mathematics 1 116](#) (JPO 116) - Credits: 8.00

[Professional orientation 120](#) (JPO 120) - Credits: 8.00

[Additional Physics 122](#) (JPO 122) - Credits: 8.00

[Additional Mathematics 2 126](#) (JPO 126) - Credits: 8.00

[Calculus 158](#) (WTW 158) - Credits: 16.00

[Mathematics 164](#) (WTW 164) - Credits: 16.00

[Workshop practice 121](#) (WWP 121) - Credits: 6.00

Curriculum: Year 2

Minimum credits: 120

Core modules

[Electricity and electronics 111](#) (EBN 111) - Credits: 16.00

[Community-based project 203](#) (JCP 203) - Credits: 8.00

[Additional Electricity and electronics 112](#) (JPO 112) - Credits: 8.00

[Additional Graphical communication 113](#) (JPO 113) - Credits: 8.00

[Additional Materials science 123](#) (JPO 123) - Credits: 8.00

[Additional Mechanics 125](#) (JPO 125) - Credits: 8.00

[Graphical communication 110](#) (MGC 110) - Credits: 16.00

[Materials science 123](#) (NMC 123) - Credits: 16.00

[Mechanics 122](#) (SWK 122) - Credits: 16.00

[Calculus 258](#) (WTW 258) - Credits: 8.00

[Numerical methods 263](#) (WTW 263) - Credits: 8.00

Curriculum: Year 3

Minimum credits: 138

Students are required to register for NTC210 as well.

Core modules

Engineering statistics 220 (BES 220) - Credits: 8.00
Electrical engineering 221 (EIR 221) - Credits: 16.00
Mineralogy 210 (GMI 210) - Credits: 16.00
Programming and information technology 213 (MPR 213) - Credits: 16.00
Dynamics 210 (MSD 210) - Credits: 16.00
Professional and technical communication 210 (NJJ 210) - Credits: 8.00
Materials science 223 (NMC 223) - Credits: 16.00
Process thermodynamics 220 (NPT 220) - Credits: 16.00
Metallurgical calculations 210 (NTC 210) - Credits: 8.00
Mathematics 238 (WTW 238) - Credits: 16.00
Differential equations 256 (WTW 256) - Credits: 8.00

Curriculum: Year 4

Minimum credits: 144

Students are required to register for NTV310 and NPB312.

Students who failed NEC310 and NEX320 in 2019 will be allowed to repeat it in 2020 for the final time.

Core modules

Engineering management 310 (BSS 310) - Credits: 8.00
Engineering activity and group work 320 (MIA 320) - Credits: 8.00
Electrochemistry 310 (NEC 310) - Credits: 16.00
Excursions 320 (NEX 320) - Credits: 8.00
Hydrometallurgy 322 (NHM 322) - Credits: 16.00
Materials science 313 (NMC 313) - Credits: 16.00
Mechanical metallurgy 320 (NMM 320) - Credits: 16.00
Minerals processing 310 (NMP 310) - Credits: 16.00
Process heat transfer and control 312 (NPB 312) - Credits: 16.00
Pyrometallurgy 321 (NPM 321) - Credits: 16.00
Industrial training 316 (NPY 316) - Credits: 16.00
Metallurgical fluid mechanics 310 (NTV 310) - Credits: 8.00
Refractory materials 321 (NVM 321) - Credits: 8.00

Curriculum: Final year

Minimum credits: 136

Students who failed NPB412 in 2019 will be allowed to repeat it in 2020 for the final time.

Core modules

Engineering professionalism 410 (IPI 410) - Credits: 8.00
Hydrometallurgy 412 (NHM 412) - Credits: 16.00
Minerals processing 411 (NMP 411) - Credits: 16.00
Process design 421 (NOP 421) - Credits: 32.00
Process metallurgy and control 412 (NPB 412) - Credits: 8.00
Metals processing 411 (NPW 411) - Credits: 16.00
Industrial training 416 (NPY 416) - Credits: 16.00
Literature survey and research planning 412 (NSC 412) - Credits: 8.00

Project 422 (NSC 422) - Credits: 32.00

BEng Mining Engineering (12130006)

Minimum duration of study 4 years

Programme information

All fields of study of the BEng degree have been accredited by the Engineering Council of South Africa (ECSA), and comply with the academic requirements for registration as a professional engineer. The programmes are designed in accordance with the outcomes-based model as required by the South African Qualifications Authority (SAQA). The learning outcomes and contents of the programmes have been compiled in accordance with the latest accreditation standards (PE-60 and PE-61) of ECSA, which also comply with the SAQA requirements, and which are summarised as follows:

Learning outcomes of the BEng degree:

A graduate in engineering should be able to apply the following skills on an advanced level:

- a. Engineering problem solving.
- b. Application of specialist and fundamental knowledge, with specific reference to mathematics, basic sciences and engineering sciences.
- c. Engineering design and synthesis.
- d. Investigation, experimentation and data analysis.
- e. Engineering methods, skills, tools and information technology.
- f. Professional and general communication.
- g. Awareness and knowledge of the impact of engineering activity on society and the physical environment.
- h. Work in teams and in multidisciplinary environments.
 - i. An awareness and ability for lifelong learning.
 - j. An awareness and knowledge of principles of professional ethics and practice.
- k. Awareness and knowledge of engineering management principles and economic decision-making.

Learning contents of the BEng programmes:

Six essential knowledge areas are included in the syllabi of the programmes. The typical representation of each knowledge area as a percentage of the total contents of an undergraduate programme is given in brackets () in the list below. This percentage varies for the different study directions, but conforms in all instances to the minimum knowledge area content as stipulated by ECSA.

Knowledge areas:

- a. Mathematics, including numerical methods and statistics (13%)
- b. Basic sciences: the natural sciences essential to the programme (15%)
- c. Engineering sciences (40%)
- d. Engineering design and synthesis (16%)
- e. Computing and information technology (5%)
- f. Complementary studies: communication, economy, management, innovation, environmental impact, ethics, engineering practice (11%).

Admission requirements

- The following persons will be considered for admission: candidates who are in possession of a certificate that is

deemed by the University to be equivalent to the required Grade 12 certificate with university endorsement; candidates who are graduates from another tertiary institution or have been granted the status of a graduate of such an institution; and candidates who are graduates of another faculty at the University of Pretoria.

- Life Orientation is excluded when calculating the APS.
- Grade 11 results are used in the conditional admission of prospective students.
- A valid qualification with admission to degree studies is required.
- Minimum subject and achievement requirements, as set out below, are required.
- Conditional admission to the four-year programmes in the School of Engineering is only guaranteed if a prospective student complies with ALL the requirements below.
- **Note:** Candidates who do not comply with the minimum requirements, set out above, but who have obtained a minimum APS of 30, an achievement level of 5 for English, 6 for Mathematics and 5 for Physical Science, will be considered for conditional admission to either the four-year programme or the ENGAGE programme based on the results of the NBT.
- Admission to ENGAGE in the School of Engineering will be determined by the results of the NBT, NSC results, an achievement level of 5 in Mathematics and 5 in Physical Science, as well as an achievement level of 5 in English, together with an APS of 30.
- Students may apply directly to be considered for the ENGAGE programme.
- Tuition will be presented in English only.

Minimum requirements

Achievement level

English Home

Language or

English First

Additional

Language

NSC/IEB	AS Level	Mathematics	AS Level	Physical Science	AS Level	APS
5	C	6	B	6	B	35

* Cambridge A level candidates who obtained at least a D in the required subjects, will be considered for admission. International Baccalaureate (IB) HL candidates who obtained at least a 4 in the required subjects, will be considered for admission.

ENGAGE Programme minimum requirements

Achievement level

English Home

Language or

English First

Additional

Language

NSC/IEB	AS Level	Mathematics	AS Level	Physical Science	AS Level	APS
5	C	5	C	5	C	30

Other programme-specific information

With a few exceptions, most modules offered at the School of Engineering are semester modules having credit values of either 8 or 16.

A student may be permitted by the Dean, on recommendation of the relevant head of department, to register for an equivalent module in an alternate semester, although the module is normally offered to the student's group in

another semester, and providing that no timetable clashes occur.

Please note:

1. All students are required to successfully complete JCP 203, Community-based project 203, as part of the requirements for the BEng degree. A student may register for the module during any of the years of study of the programme, but preferably not during the first or the final year of study.
2. Students registered for Chemical Engineering who have passed CBI 311 or CBI 410, receive credit for CBI 310.
3. Mechanical Engineering: For the Aeronautical Option, the themes of both the Design and the Project must be aeronautical-related.
4. Offering of electives depends on the availability of resources and industry support.

Promotion to next study year

Promotion to the second semester of the first year and to the second year of study (Eng. 14)

- a. A new first-year student who has failed in all the prescribed modules of the programme at the end of the first semester, is excluded from studies in the School of Engineering. A student who is registered for the Engineering Augmented Degree Programme and has passed only 8 credits will also be excluded.
- b. A student who complies with all the requirements of the first year of study, is promoted to the second year of study.
- c. A student who has not passed at least 70% of the credits of the first year of study after the November examinations, must reapply for admission should he/she intend to proceed with his/her studies. Application on the prescribed form must be submitted to the Student Administration of the School of Engineering not later than 11 January. Late applications will be accepted only in exceptional circumstances after approval by the Dean. Should first-year students be readmitted, conditions of readmission will be determined by the Admissions Committee.
- d. Students who have not passed all the prescribed modules at first year level (level 100), as well as students who are readmitted in terms of Faculty Regulations must register for the outstanding first-year level (level-100) modules.
- e. A student who is repeating his or her first year, may, on recommendation of the relevant heads of department and with the approval of the Dean, be permitted to enroll for modules of the second-year of study in addition to the first-year modules which he or she failed, providing that he or she complies with the prerequisites for the second-year modules and no timetable clashes occur. Students on the ENGAGE programme may, following the same procedure, be permitted to enrol for level-200 modules in addition to the level-100 modules which he/she failed providing that he/she complies with the prerequisites for the modules at 200-level and no timetable clashes occur. On recommendation of the relevant head of department and with special permission from the Dean, permission may be granted to exceed the prescribed number of credits. The total number of credits which may be approved may not exceed the normal number of credits per semester by more than 16 credits.
- f. Students in Computer, Electrical and Electronic Engineering, who fail a first-year module for the second time, forfeit the privilege of registering for any modules of an advanced year of study.

Please note:

- i. From the second year of study each student should be in possession of an approved calculator. It is assumed that each student will have easy access to a laptop computer.
- ii. Students who intend transferring to Mining Engineering, must familiarise themselves with the stipulations set

out in the syllabi of PWP 121 Workshop practice 121.

Promotion to the third year of study of the Four-year Programme, as well as to the third and the fourth years of study of the ENGAGE Programme. In case of the fourth year of study of the ENGAGE Programme, the words "first", "second" and "third" must be substituted with the words "second", "third" and "fourth" respectively. (Eng. 15)

- a. A student who complies with all the requirements of the second year of study, is promoted to the third year of study.
- b. A student must pass all the prescribed modules at first year level (level 100) before he or she is admitted to any module at third year level (level 300).
- c. A student who is repeating his or her second year must register for all the second-year modules still outstanding. Such a student may, on recommendation of the relevant head of department and with the approval of the Dean, be permitted to enroll for modules of the third year of study in addition to the second-year modules which he or she failed, providing that he or she complies with the prerequisites for the third-year modules and no timetable clashes occur. On recommendation of the relevant head of department, and with special permission from the Dean, permission may be granted to exceed the prescribed number of credits. The total number of credits which may be approved may not exceed the normal number of credits per semester by more than 16 credits.
- d. Students in Computer, Electrical and Electronic Engineering who fail a second-year module for the second time forfeit the privilege of registering for any modules of the third year of study.
- e. Students who intend transferring to Mining Engineering must familiarise themselves with the stipulations set out in the syllabi of PWP 120 Workshop practice 120, as well as PPY 317 Practical training 317.

Promotion to the fourth year of study of the Four-year Programme, as well as to the fifth year of study of the ENGAGE Programme. In case of the fifth year of study of the ENGAGE Programme, the words "second", "third" and "fourth" must be substituted with the words "third", "fourth" and "fifth" respectively. (Eng. 16)

- a. A student who complies with all the requirements of the third year of study is promoted to the fourth year of study. A student who does not comply with all the requirements but who is able to register for all outstanding modules in order to complete the degree programme, may at registration be promoted to the fourth year of study.
- b. A student must pass all the prescribed modules of the second year of study, before he or she is admitted to any module of the fourth year of study.
- c. A student who has not passed all the prescribed modules of the third year of study, must register for the outstanding modules. A student may be admitted by the Dean, on the recommendation of the relevant head of department, to modules of the fourth year of study, in addition to the outstanding third-year modules, provided that he or she complies with the prerequisites of the fourth-year modules and no timetable clashes occur. The total number of credits per semester for which a student registers may not exceed the normal number of credits per semester by more than 16 credits. In exceptional cases, the Dean may, on recommendation of the relevant head of department, permit a student to exceed the above limit.
- d. Students in Computer, Electrical and Electronic Engineering who fail a third-year module for the second time, forfeit the privilege of registering for any modules of the fourth year of study.

Pass with distinction

- a. A student graduates with distinction if:
 - i. no module of the third or fourth year of study of the four year programme or of the fourth or fifth year of the ENGAGE programme was repeated and a weighted average of at least 75% was obtained in one year in all the modules of the final year of study; and
 - ii. the degree programme was completed within the prescribed four years for the four year programme and within the prescribed five years of the ENGAGE programme.
- b. Exceptional cases to the above will be considered by the Dean.

Curriculum: Year 1

Minimum credits: 152

Fundamental modules

[Academic orientation 112](#) (UPO 112) - Credits: 0.00

Core modules

[General chemistry 171](#) (CHM 171) - Credits: 16.00

[Electricity and electronics 122](#) (EBN 122) - Credits: 16.00

[Physics 176](#) (FSK 176) - Credits: 16.00

[Humanities and social sciences 110](#) (HAS 110) - Credits: 8.00

[Humanities and social sciences 120](#) (HAS 120) - Credits: 8.00

[Graphical communication 110](#) (MGC 110) - Credits: 16.00

[Materials science 113](#) (NMC 113) - Credits: 16.00

[Introduction to mining 121](#) (PMY 121) - Credits: 8.00

[Workshop practice 121](#) (PWP 121) - Credits: 8.00

[Mechanics 122](#) (SWK 122) - Credits: 16.00

[Calculus 158](#) (WTW 158) - Credits: 16.00

[Mathematics 164](#) (WTW 164) - Credits: 16.00

Curriculum: Year 2

Minimum credits: 150

Core modules

[Engineering statistics 220](#) (BES 220) - Credits: 8.00

[Community-based project 203](#) (JCP 203) - Credits: 8.00

[Programming and information technology 213](#) (MPR 213) - Credits: 16.00

[Dynamics 210](#) (MSD 210) - Credits: 16.00

[Thermodynamics 221](#) (MTX 221) - Credits: 16.00

[Professional and technical communication 210](#) (PJJ 210) - Credits: 8.00

[Mining technology 220](#) (PMY 220) - Credits: 8.00

[Experiential training 220](#) (PPY 220) - Credits: 16.00

[Surveying 220](#) (SUR 220) - Credits: 14.00

[Strength of materials 210](#) (SWK 210) - Credits: 16.00

[Mathematics 238](#) (WTW 238) - Credits: 16.00

[Differential equations 256](#) (WTW 256) - Credits: 8.00

Calculus 258 (WTW 258) - Credits: 8.00
Numerical methods 263 (WTW 263) - Credits: 8.00

Curriculum: Year 3

Minimum credits: 144

Core modules

Engineering management 310 (BSS 310) - Credits: 8.00
Geology for engineering 256 (GLY 256) - Credits: 16.00
Engineering activity and group work 320 (MIA 320) - Credits: 8.00
Fluid mechanics 310 (MTV 310) - Credits: 16.00
Minerals processing 310 (NMP 310) - Credits: 16.00
Basic mine ventilation engineering 321 (PEE 321) - Credits: 8.00
Surface mining 311 (PMY 311) - Credits: 16.00
Mining 320 (PMY 320) - Credits: 16.00
Industrial excursions 300 (PNB 300) - Credits: 8.00
Experiential training 320 (PPY 320) - Credits: 16.00
Rock breaking 321 (PRX 321) - Credits: 16.00
Introduction to project 321 (PSC 321) - Credits: 8.00
Strata control 310 (PSZ 310) - Credits: 16.00

Curriculum: Final year

Minimum credits: 138

Core modules

Geodynamics and ore formation 352 (GLY 352) - Credits: 18.00
Engineering professionalism 410 (IPI 410) - Credits: 8.00
Mine ventilation engineering 410 (PEE 410) - Credits: 8.00
Mine evaluation 410 (PMW 410) - Credits: 16.00
Mining 410 (PMY 410) - Credits: 16.00
Mine operational risk management 423 (PMY 423) - Credits: 8.00
Mine design and research 422 (PMZ 422) - Credits: 32.00
Project 411 (PSC 411) - Credits: 16.00
Rock engineering 410 (PSZ 410) - Credits: 16.00

BEng Mining Engineering ENGAGE (12136006)

Minimum duration of study 5 years

Programme information

Please note: The Engineering Augmented Degree Programme (ENGAGE) is an extended degree programme with a five-year curriculum. It is designed to enable students who show academic potential but who do not meet the normal entry requirements for the four-year degree programme, to obtain an Engineering degree. ENGAGE students spend the first three years of the programme covering the content of the first two years of the four-year degree programme. They also take compulsory augmented modules in each of the Level 1 subjects. These augmented modules provide students with background knowledge and skills needed to succeed in an engineering degree. The curriculum for years four and five of the ENGAGE programme are identical to the curriculum for years 3 and 4 of the 4-year programme, respectively. Students may apply directly for admission to

the programme.

- Students must register for the entire programme, not components of it. The curriculum is fixed; there are no electives.
- Attendance at all components of years 1 to 3 of the programme is compulsory. Non-attendance will only be condoned in the case of illness (sick note required) or family crisis (e.g. a death in the family), in which case students must inform the programme administration immediately.
- Students who fail to meet the attendance requirement for any module in any semester of years 1 to 3 of the programme will be excluded from the programme.
- No augmented module may be repeated more than once.
- Selection into the programme will be based on a combination of performance in the National Senior Certificate examinations or equivalent and other selection tests approved by the faculty.
- A student who fails a mainstream module (e.g. Chemistry) but passes the associated augmented module (e.g. Additional chemistry) does not need to repeat the augmented module.
- A student who fails an augmented module (e.g. Additional chemistry) but passes the associated mainstream module (e.g. Chemistry) does not need to repeat the mainstream module.
- A student must meet the attendance requirement and obtain at least 40% for both the continuous assessment and test components as well as a final mark of 50% in order to pass an augmented module.
- i. The curricula of the fourth and the fifth years of study are identical to those of the third and the fourth years of the four-year programme.
- ii. JPO 110 is a prerequisite for JPO 120. Credit for JPO is obtained with a final mark of more than 50%.
Conditional admission to JPO 120: If the final mark for JPO 110 is between 45% and 49%, a student can register for JPO 120 but credit for JPO 110 and JPO 120 will only be obtained if the final combined mark for JPO 110 and JPO 120 is above 50%.

Please note: All students will be required to successfully complete JCP 203, Community-based project 203, as part of the requirements for the BEng degree. A student may register for the module during any of the years of study of the programme, but preferably not during the first or the final year of study.

Learning outcomes of the BEng degree:

A graduate in engineering should be able to apply the following skills on an advanced level:

- a. Engineering problem solving.
- b. Application of specialist and fundamental knowledge, with specific reference to mathematics, basic sciences and engineering sciences.
- c. Engineering design and synthesis.
- d. Investigation, experimentation and data analysis.
- e. Engineering methods, skills, tools and information technology.
- f. Professional and general communication.
- g. Awareness and knowledge of the impact of engineering activity on society and the physical environment.
- h. Work in teams and in multidisciplinary environments.
- i. An awareness and ability for lifelong learning.
- j. An awareness and knowledge of principles of professional ethics and practice.
- k. Awareness and knowledge of engineering management principles and economic decision-making.

Learning contents of the BEng programmes:

Six essential knowledge areas are included in the syllabi of the programmes. The typical representation of each knowledge area as a percentage of the total contents of an undergraduate programme is given in brackets () in the list below. This percentage varies for the different study directions, but conforms in all instances to the

minimum knowledge area content as stipulated by ECSA.

Knowledge areas:

- a. Mathematics, including numerical methods and statistics (13%)
- b. Basic sciences: the natural sciences essential to the programme (15%)
- c. Engineering sciences (40%)
- d. Engineering design and synthesis (16%)
- e. Computing and information technology (5%)
- f. Complementary studies: communication, economy, management, innovation, environmental impact, ethics, engineering practice (11%).

Promotion to next study year

Promotion to the second semester of the first year and to the second year of study (Eng. 14)

- a. A new first-year student who has failed in all the prescribed modules of the programme at the end of the first semester, is excluded from studies in the School of Engineering. A student who is registered for the Engineering Augmented Degree Programme and has passed only 8 credits will also be excluded.
- b. A student who complies with all the requirements of the first year of study, is promoted to the second year of study.
- c. A student who has not passed at least 70% of the credits of the first year of study after the November examinations, must reapply for admission should he/she intend to proceed with his/her studies. Application on the prescribed form must be submitted to the Student Administration of the School of Engineering not later than 11 January. Late applications will be accepted only in exceptional circumstances after approval by the Dean. Should first-year students be readmitted, conditions of readmission will be determined by the Admissions Committee.
- d. Students who have not passed all the prescribed modules at first year level (level 100), as well as students who are readmitted in terms of Faculty Regulations must register for the outstanding first-year level (level-100) modules.
- e. A student who is repeating his or her first year, may, on recommendation of the relevant heads of department and with the approval of the Dean, be permitted to enroll for modules of the second-year of study in addition to the first-year modules which he or she failed, providing that he or she complies with the prerequisites for the second-year modules and no timetable clashes occur. Students on the ENGAGE programme may, following the same procedure, be permitted to enrol for level-200 modules in addition to the level-100 modules which he/she failed providing that he/she complies with the prerequisites for the modules at 200-level and no timetable clashes occur. On recommendation of the relevant head of department and with special permission from the Dean, permission may be granted to exceed the prescribed number of credits. The total number of credits which may be approved may not exceed the normal number of credits per semester by more than 16 credits.
- f. Students in Computer, Electrical and Electronic Engineering, who fail a first-year module for the second time, forfeit the privilege of registering for any modules of an advanced year of study.

Please note:

- i. From the second year of study each student should be in possession of an approved calculator. It is assumed that each student will have easy access to a laptop computer.
- ii. Students who intend transferring to Mining Engineering, must familiarise themselves with the stipulations set out in the syllabi of PWP 121 Workshop practice 121.

Promotion to the third year of study of the Four-year Programme, as well as to the third and the fourth years of study of the ENGAGE Programme. In case of the fourth year of study of the ENGAGE Programme, the words "first", "second" and "third" must be substituted with the words "second", "third" and "fourth" respectively. (Eng. 15)

- a. A student who complies with all the requirements of the second year of study, is promoted to the third year of study.
- b. A student must pass all the prescribed modules at first year level (level 100) before he or she is admitted to any module at third year level (level 300).
- c. A student who is repeating his or her second year must register for all the second-year modules still outstanding. Such a student may, on recommendation of the relevant head of department and with the approval of the Dean, be permitted to enroll for modules of the third year of study in addition to the second-year modules which he or she failed, providing that he or she complies with the prerequisites for the third-year modules and no timetable clashes occur. On recommendation of the relevant head of department, and with special permission from the Dean, permission may be granted to exceed the prescribed number of credits. The total number of credits which may be approved may not exceed the normal number of credits per semester by more than 16 credits.
- d. Students in Computer, Electrical and Electronic Engineering who fail a second-year module for the second time forfeit the privilege of registering for any modules of the third year of study.
- e. Students who intend transferring to Mining Engineering must familiarise themselves with the stipulations set out in the syllabi of PWP 120 Workshop practice 120, as well as PPY 317 Practical training 317.

Promotion to the fourth year of study of the Four-year Programme, as well as to the fifth year of study of the ENGAGE Programme. In case of the fifth year of study of the ENGAGE Programme, the words "second", "third" and "fourth" must be substituted with the words "third", "fourth" and "fifth" respectively. (Eng. 16)

- a. A student who complies with all the requirements of the third year of study is promoted to the fourth year of study. A student who does not comply with all the requirements but who is able to register for all outstanding modules in order to complete the degree programme, may at registration be promoted to the fourth year of study.
- b. A student must pass all the prescribed modules of the second year of study, before he or she is admitted to any module of the fourth year of study.
- c. A student who has not passed all the prescribed modules of the third year of study, must register for the outstanding modules. A student may be admitted by the Dean, on the recommendation of the relevant head of department, to modules of the fourth year of study, in addition to the outstanding third-year modules, provided that he or she complies with the prerequisites of the fourth-year modules and no timetable clashes occur. The total number of credits per semester for which a student registers may not exceed the normal number of credits per semester by more than 16 credits. In exceptional cases, the Dean may, on recommendation of the relevant head of department, permit a student to exceed the above limit.
- d. Students in Computer, Electrical and Electronic Engineering who fail a third-year module for the second time, forfeit the privilege of registering for any modules of the fourth year of study.

Pass with distinction

- a. A student graduates with distinction if:

-
- i. no module of the third or fourth year of study of the four year programme or of the fourth or fifth year of the ENGAGE programme was repeated and a weighted average of at least 75% was obtained in one year in all the modules of the final year of study; and
 - ii. the degree programme was completed within the prescribed four years for the four year programme and within the prescribed five years of the ENGAGE programme.
- b. Exceptional cases to the above will be considered by the Dean.

Curriculum: Year 1

Minimum credits: 128

Fundamental modules

[Academic orientation 112](#) (UPO 112) - Credits: 0.00

Core modules

[General chemistry 171](#) (CHM 171) - Credits: 16.00

[Physics 176](#) (FSK 176) - Credits: 16.00

[Humanities and social sciences 110](#) (HAS 110) - Credits: 8.00

[Humanities and social sciences 120](#) (HAS 120) - Credits: 8.00

[Professional orientation 110](#) (JPO 110) - Credits: 8.00

[Additional Chemistry 1 111](#) (JPO 111) - Credits: 8.00

[Additional Mathematics 1 116](#) (JPO 116) - Credits: 8.00

[Professional orientation 120](#) (JPO 120) - Credits: 8.00

[Additional Physics 122](#) (JPO 122) - Credits: 8.00

[Additional Mathematics 2 126](#) (JPO 126) - Credits: 8.00

[Workshop practice 121](#) (PWP 121) - Credits: 8.00

[Calculus 158](#) (WTW 158) - Credits: 16.00

[Mathematics 164](#) (WTW 164) - Credits: 16.00

Curriculum: Year 2

Minimum credits: 128

Core modules

[Electricity and electronics 122](#) (EBN 122) - Credits: 16.00

[Community-based project 203](#) (JCP 203) - Credits: 8.00

[Additional Electricity and electronics 112](#) (JPO 112) - Credits: 8.00

[Additional Graphical communication 113](#) (JPO 113) - Credits: 8.00

[Additional Materials science 123](#) (JPO 123) - Credits: 8.00

[Additional Mechanics 125](#) (JPO 125) - Credits: 8.00

[Graphical communication 110](#) (MGC 110) - Credits: 16.00

[Materials science 123](#) (NMC 123) - Credits: 16.00

[Introduction to mining 121](#) (PMY 121) - Credits: 8.00

[Experiential training 220](#) (PPY 220) - Credits: 16.00

[Mechanics 122](#) (SWK 122) - Credits: 16.00

[Calculus 258](#) (WTW 258) - Credits: 8.00

[Numerical methods 263](#) (WTW 263) - Credits: 8.00

Curriculum: Year 3

Minimum credits: 130

Core modules

Engineering statistics 220 (BES 220) - Credits: 8.00
Programming and information technology 213 (MPR 213) - Credits: 16.00
Dynamics 210 (MSD 210) - Credits: 16.00
Thermodynamics 221 (MTX 221) - Credits: 16.00
Professional and technical communication 210 (PJJ 210) - Credits: 8.00
Mining technology 220 (PMY 220) - Credits: 8.00
Surveying 220 (SUR 220) - Credits: 14.00
Strength of materials 210 (SWK 210) - Credits: 16.00
Mathematics 238 (WTW 238) - Credits: 16.00
Differential equations 256 (WTW 256) - Credits: 8.00

Curriculum: Year 4

Minimum credits: 144

Core modules

Engineering management 310 (BSS 310) - Credits: 8.00
Geology for engineering 256 (GLY 256) - Credits: 16.00
Engineering activity and group work 320 (MIA 320) - Credits: 8.00
Fluid mechanics 310 (MTV 310) - Credits: 16.00
Minerals processing 310 (NMP 310) - Credits: 16.00
Basic mine ventilation engineering 321 (PEE 321) - Credits: 8.00
Surface mining 311 (PMY 311) - Credits: 16.00
Mining 320 (PMY 320) - Credits: 16.00
Industrial excursions 300 (PNB 300) - Credits: 8.00
Experiential training 320 (PPY 320) - Credits: 16.00
Rock breaking 321 (PRX 321) - Credits: 16.00
Introduction to project 321 (PSC 321) - Credits: 8.00
Strata control 310 (PSZ 310) - Credits: 16.00

Curriculum: Final year

Minimum credits: 138

Core modules

Geodynamics and ore formation 352 (GLY 352) - Credits: 18.00
Engineering professionalism 410 (IPI 410) - Credits: 8.00
Mine ventilation engineering 410 (PEE 410) - Credits: 8.00
Mine evaluation 410 (PMW 410) - Credits: 16.00
Mining 410 (PMY 410) - Credits: 16.00
Mine operational risk management 423 (PMY 423) - Credits: 8.00
Mine design and research 422 (PMZ 422) - Credits: 32.00
Project 411 (PSC 411) - Credits: 16.00
Rock engineering 410 (PSZ 410) - Credits: 16.00

BIS Information Science (12131012)

Minimum duration of study 3 years

Contact Prof MA Holmner marlene.holmner@up.ac.za +27 (0)124205215

Programme information

The increasing amount of information available and developing information needs have necessitated the training of information intermediaries to effectively facilitate the bringing together of users and the information they require.

This package focuses on the use of information technology and the processing of information products and is designed to train students in the management, retrieval and organisation of information, as well as to teach them how to add value to, package and distribute information. Students will also have the opportunity to develop knowledge and skills in the management of one of the most important resources of enterprises – information and knowledge. Two or three specialisation options are available, depending on the electives chosen.

Admission requirements

- The following persons will be considered for admission: candidates who are in possession of a certificate that is deemed by the University to be equivalent to the required Grade 12 certificate with university endorsement; candidates who are graduates from another tertiary institution or have been granted the status of a graduate of such an institution; and candidates who are graduates of another faculty at the University of Pretoria.
- Life Orientation is excluded when calculating the APS.
- Grade 11 results are used in the conditional admission of prospective students.
- A valid qualification with admission to degree studies is required.
- Minimum subject and achievement requirements, as set out below, are required.
- Tuition will be presented in English only.
- Should a candidate obtain an APS of 25 to 27, consideration for admission will be based on the results of the NBT, provided the numbers of students in designated groups have not been reached. If informatics is selected at first-year level, an achievement level of 5 is required in Mathematics.

Minimum requirements

Achievement level

English Home Language or English

First Additional Language

APS

NSC/IEB

AS Level

4

D

28

(25 - 27 admission based on the NBT)

* Cambridge A level candidates who obtained at least a D in the required subjects, will be considered for admission. International Baccalaureate (IB) HL candidates who obtained at least a 4 in the required subjects, will be considered for admission.

Other programme-specific information

Because credits are not calculated in the same way in all faculties, students should ensure note that the total number of credits required for this package is at least 415-458 depending on the choice of elective modules (as required for Group A, B or C).

Curriculum: Year 1

Minimum credits: 110

Elective modules: Select one group in consultation with the package organiser, at least 30 credits from any modules at year level one OR Select 50 credits from the INF elective group. Students who obtained at least 4(50% - 59%) for Mathematics in Grade 12 will be admitted to Informatics 112 and students who obtained at least 5(60 - 69%) for Mathematics in Grade 12 will be admitted to Informatics 154, 164 and 171.

Fundamental modules

Academic information management 101 (AIM 101) - Credits: 6.00

Academic literacy for Information Technology 121 (ALL 121) - Credits: 6.00

Academic orientation 112 (UPO 112) - Credits: 0.00

Core modules

Information science 110 (INL 110) - Credits: 12.00

Information science 120 (INL 120) - Credits: 12.00

Information science 130 (INL 130) - Credits: 12.00

Information science 140 (INL 140) - Credits: 12.00

Business management 114 (OBS 114) - Credits: 10.00

Business management 124 (OBS 124) - Credits: 10.00

Elective modules

Afrikaans 110 (AFR 110) - Credits: 12.00

Afrikaans 120 (AFR 120) - Credits: 12.00

Archaeology 110 (AGL 110) - Credits: 12.00

Archaeology 120 (AGL 120) - Credits: 12.00

Introduction to tourism 110 (EFK 110) - Credits: 12.00

Heritage tourism management 120 (EFK 120) - Credits: 12.00

English 110 (ENG 110) - Credits: 12.00

English 120 (ENG 120) - Credits: 12.00

Informatics 112 (INF 112) - Credits: 10.00

Informatics 154 (INF 154) - Credits: 10.00

Informatics 164 (INF 164) - Credits: 10.00

Informatics 171 (INF 171) - Credits: 20.00

Criminology 110 (KRM 110) - Credits: 12.00

Criminology 120 (KRM 120) - Credits: 12.00

Public administration 112 (PAD 112) - Credits: 10.00

Public administration 122 (PAD 122) - Credits: 10.00

Psychology 110 (SLK 110) - Credits: 12.00

Psychology 120 (SLK 120) - Credits: 12.00

Sociology 110 (SOC 110) - Credits: 12.00

Sociology 120 (SOC 120) - Credits: 12.00

Curriculum: Year 2

Minimum credits: 160

Elective modules: Select one group in consultation with the package organiser, at least 63 credits from INF elective group OR Select 60 credits from INL elective group.

Fundamental modules

Community-based project 202 (JCP 202) - Credits: 8.00

Core modules

Information science 210 (INL 210) - Credits: 20.00

Information science 220 (INL 220) - Credits: 20.00

Information science 240 (INL 240) - Credits: 20.00

Business management 210 (OBS 210) - Credits: 16.00

Business management 220 (OBS 220) - Credits: 16.00

Elective modules

Informatics 214 (INF 214) - Credits: 14.00

Informatics 225 (INF 225) - Credits: 14.00

Informatics 261 (INF 261) - Credits: 7.00

Informatics 271 (INF 271) - Credits: 14.00

Informatics 272 (INF 272) - Credits: 14.00

Information science 230 (INL 230) - Credits: 20.00

Information science 260 (INL 260) - Credits: 20.00

Information science 270 (INL 270) - Credits: 20.00

Curriculum: Final year

Minimum credits: 145

Elective modules: Select one group in consultation with the package organiser,

Group A (70 credits) Select two INF modules and at least 40 credits OBS modules at year level 3.

Group B (90 credits) Select three INL modules

Group C (90 credits) Select two INF modules and at least 60 credits from Group B.

Core modules

Information science: Information organisation 310 (INL 310) - Credits: 30.00

Information science: Information and knowledge management 320 (INL 320) - Credits: 30.00

Information science 370 (INL 370) - Credits: 15.00

Elective modules

Informatics 315 (INF 315) - Credits: 15.00

Informatics 324 (INF 324) - Credits: 15.00

Information science: Digital repositories 340 (INL 340) - Credits: 30.00

Information science: Socio-political aspects of information in global context 360 (INL 360) - Credits: 30.00

Information science: Competitive intelligence 380 (INL 380) - Credits: 30.00

BIS Multimedia (12131013)

Minimum duration of study 3 years

Contact Mr JW de Beer koos.debeer@up.ac.za +27 (0)124202833

Programme information

Modern information technology offers the possibility of information products being designed and created

comprising various types of media over and above the traditional text medium. Information technology therefore results in the convergence of various previously separate traditional media. There is not a single discipline that handles the combination of information products. The multimedia qualification in the department of Information science addresses this shortcoming. Any type of institution in all economic spheres, including government, may profit from a multimedia approach to information design, organisation and retrieval.

Multimedia documents include text, graphics, sound, video and animation. The purpose of this qualification is to enable students to understand the necessary concepts to build multimedia products and maintain the products. This programme is therefore a combination of theory and practice. The explosion of the web, as well as the exponential growth and power of information technology, requires the introduction of this degree following international trends.

Admission requirements

- The following persons will be considered for admission: candidates who are in possession of a certificate that is deemed by the University to be equivalent to the required Grade 12 certificate with university endorsement; candidates who are graduates from another tertiary institution or have been granted the status of a graduate of such an institution; and candidates who are graduates of another faculty at the University of Pretoria.
- Life Orientation is excluded when calculating the APS.
- Grade 11 results are used in the conditional admission of prospective students.
- A valid qualification with admission to degree studies is required.
- Minimum subject and achievement requirements, as set out below, are required.
- Tuition will be presented in English only.
- Should a candidate obtain an APS of 26 to 29, consideration for admission will be based on the results of the NBT, provided the numbers of students in designated groups have not been reached.

Minimum requirements

Achievement level

English Home Language or English First Additional Language

NSC/IEB	AS Level	NSC/IEB	AS Level
4	D	5	C

Mathematics

APS

30

(26 - 29 admission based on the NBT)

* Cambridge A level candidates who obtained at least a D in the required subjects, will be considered for admission. International Baccalaureate (IB) HL candidates who obtained at least a 4 in the required subjects, will be considered for admission.

Other programme-specific information

Please Note:

The semester in which these modules are offered may vary from year to year.

Students who wish to continue with a BScHons (CS) should consult the Computer Science department for the correct admission requirements to the degree. COS 301 and three COS electives are compulsory admission requirements for BScHons (CS).

Pass with distinction

A degree (undergraduate) in the School of IT is conferred with distinction on a student who did not repeat any

module of his/her final year, obtained a weighted average of at least 75% in all the prescribed modules for the final year, provided that a subminimum of 65% is obtained in each of these modules and provided that the degree is completed in the prescribed minimum period of time. Ad hoc cases will be considered by the Dean, in consultation with the relevant head of department.

Curriculum: Year 1

Minimum credits: 144

Fundamental modules

Academic information management 101 (AIM 101) - Credits: 6.00
Academic information management 111 (AIM 111) - Credits: 4.00
Academic information management 121 (AIM 121) - Credits: 4.00
Academic literacy for Information Technology 121 (ALL 121) - Credits: 6.00
Academic orientation 112 (UPO 112) - Credits: 0.00

Core modules

Program design: Introduction 110 (COS 110) - Credits: 16.00
Operating systems 122 (COS 122) - Credits: 16.00
Imperative programming 132 (COS 132) - Credits: 16.00
Introduction to computer science 151 (COS 151) - Credits: 8.00
Multimedia 110 (IMY 110) - Credits: 12.00
Multimedia 120 (IMY 120) - Credits: 12.00
Information science 110 (INL 110) - Credits: 12.00
Information science 120 (INL 120) - Credits: 12.00
Information science 140 (INL 140) - Credits: 12.00
Visual design (1) 102 (VIO 102) - Credits: 16.00

Curriculum: Year 2

Minimum credits: 184

Fundamental modules

Community-based project 202 (JCP 202) - Credits: 8.00

Core modules

Data structures and algorithms 212 (COS 212) - Credits: 16.00
Software modelling 214 (COS 214) - Credits: 16.00
Netcentric computer systems 216 (COS 216) - Credits: 16.00
Concurrent systems 226 (COS 226) - Credits: 16.00
Computer organisation and architecture 284 (COS 284) - Credits: 16.00
Multimedia 210 (IMY 210) - Credits: 16.00
Multimedia 211 (IMY 211) - Credits: 20.00
Multimedia 220 (IMY 220) - Credits: 16.00
Publishing 210 (PUB 210) - Credits: 20.00
Visual design (2) 202 (VIO 202) - Credits: 24.00

Curriculum: Final year

Minimum credits: 141

Core modules

Multimedia: Project 300 (IMY 300) - Credits: 45.00

Multimedia 310 (IMY 310) - Credits: 30.00

Multimedia 320 (IMY 320) - Credits: 30.00

Elective modules

Software engineering 301 (COS 301) - Credits: 27.00

Artificial intelligence 314 (COS 314) - Credits: 18.00

Database systems 326 (COS 326) - Credits: 18.00

Computer security and ethics 330 (COS 330) - Credits: 18.00

Computer networks 332 (COS 332) - Credits: 18.00

Programming languages 333 (COS 333) - Credits: 18.00

Compiler construction 341 (COS 341) - Credits: 18.00

Computer graphics 344 (COS 344) - Credits: 18.00

BIS Publishing (12131014)

Minimum duration of study 3 years

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Programme information

This package contextualises the South African publishing industry, with specific application to book publishing and corporate publishing. The objectives are to equip students with background knowledge on the industry, role players and trends, as well as with specific skills linked to the publishing value chain. These skills include: the commissioning of manuscripts aimed at specific markets; the management of the design, reproduction and printing phase; copy-editing and proofreading; financial and marketing management. Students are empowered to act as responsible information intermediaries who can add value to publications during the various phases of the publishing process.

Admission requirements

- The following persons will be considered for admission: candidates who are in possession of a certificate that is deemed by the University to be equivalent to the required Grade 12 certificate with university endorsement; candidates who are graduates from another tertiary institution or have been granted the status of a graduate of such an institution; and candidates who are graduates of another faculty at the University of Pretoria.
- Life Orientation is excluded when calculating the APS.
- Grade 11 results are used in the conditional admission of prospective students.
- A valid qualification with admission to degree studies is required.
- Minimum subject and achievement requirements, as set out below, are required.
- Tuition will be presented in English only.
- Should a candidate obtain an APS of 25 to 27, consideration for admission will be based on the results of the NBT, provided the numbers of students in designated groups have not been reached.

Minimum requirements

Achievement level

English Home Language or English

First Additional Language

APS

NSC/IEB AS Level

5

C

28

(25 - 27 admission based on the NBT)

* Cambridge A level candidates who obtained at least a D in the required subjects, will be considered for admission. International Baccalaureate (IB) HL candidates who obtained at least a 4 in the required subjects, will be considered for admission.

Other programme-specific information

- Select a **language** up to year-level 3, from one of the language module groups, e.g. Afrikaans, English, German, French or an African language in consultation with the package organiser. A language for beginners may not be selected.
- Select modules to the level of **24 credits** on **year-level 1** of the selected language.
- Continue with the same **language** as selected on year-level 1 up to year-level 3.
- Select modules to the value of **40 credits** on **year-level 2** of the selected language.
- Select modules to the value of **30 credits** on **year-level 3** of the selected language.
- Students who wish to continue with language studies at postgraduate level should consult the specific department for the selection of their modules and may possibly have to select additional modules.

See Language groups for more information

LANGUAGE GROUPS FOR SELECTION IN PROGRAMMES

Note: Consult the yearbook for module-specific requirements/prerequisites by searching for the relevant language module.

Module group 1 - Afrikaans

Year level 1

- As a first language: AFR 110, 120
- For speakers of other languages (also for speakers of other languages who are registered for qualifications in education and law) AFR 114
- For law students (first language): AFR 110 Note: AFR 120 may be taken additionally.
- For students following a programme in education: AFR 110, 120; (first language); AFR 114 (speakers of other languages)

Year level 2

- As a first language: AFR 214, AFR 210, 220
- For students following a programme in education: AFR 214, AFR 220

Year level 3

- As a first language: AFR 311, 321
- For students following a programme in education: Any modules with alpha codes AFR offered at year level 3.

Module group 2 - English

Year level 1

- For special purposes: ENG 118
- For academic purposes: ENG 110, 120

Year level 2

ENG 210, 220

Year level 3

- ENG 310, 320
- ENG 311, 322

Module group 3 - French

Year level 1

- For beginners: FRN 104, 181 (LLM students)
- Cultural-professional (for students who have passed French in Grade 12): FRN 113, 123

Year level 2

FRN 211, 221

Year level 3

Cultural-professional: FRN 361, 362, 363, 364

Module group 4 - German

Year level 1

- For beginners: DTS 104
- Cultural-professional (for students who have passed German in Grade 12): DTS 113, 123

Year level 2

DTS 211, 221

Year level 3

Cultural-professional: DTS 361, 362, 363, 364

Module group 5 - Greek

Year level 1

GRK 110, 120

Year level 2

GRK 210, 220

Module group 6 - Hebrew

Year level 1

HEB 110, 120

Year level 2

HEB 210, 220

Module group 7 - Latin

Year level 1

LAT 110, 120 (students who passed Latin in Grade 12 may start immediately with Latin at year level 2)

Year level 2

LAT 210, 220

Year level 3

LAT 310, 320

Module group 8 - IsiNdebele

Year level 1

For speakers of isiNdebele as home language or first or second additional language

NDE 110, AFT 121

Year level 2

NDE 210, AFT 220

Year level 3

NDE 310, AFT 320

Module group 9 - IsiZulu

Year level 1

- For beginners: ZUL 110, 120
- For speakers of isiZulu as home language or first or second additional language: ZUL 111, AFT 121

Year level 2

- For students who did ZUL 110, 120 at year level 1: ZUL 210, 220
- For students who did AFT 121: ZUL 111 at year level 1: AFT 220, ZUL 211

Year level 3

ZUL 310, AFT 320

Module group 10 - Sepedi**Year level 1**

- For beginners: SEP 110,120
- For speakers of Sepedi as home language or first or second additional language: SEP 111, AFT 121

Year level 2

- For students who did SEP 110, 120 at year level 1: SEP 210, 220
- For students who did AFT 121, SEP 111 at year level 1: AFT 220, SEP 211

Year level 3

SEP 310, AFT 320

Module group 11 - Setswana**Year level 1**

- For beginners: STW 110, 120
- For speakers of Setswana as home language or first or second additional language: STW 111, AFT 121

Year level 2

- For students who did STW 110, 120 at year level 1: STW 210, 220
- For students who did AFT 121, STW 111 at year level 1: AFT 220, STW 211

Year level 3

STW 310, AFT 320

Module group 12 - Spanish**Year level 1**

For beginners: SPN 101, 102

Year level 2

SPN 211, 221

Year level 3

SPN 311, 321

Module group 13 - Portuguese**Year level 1**

- For beginners: PTG 101
- Portuguese language and culture (for students who have passed Portuguese in Gr 12): PTG 113, 123

Year level 2

PTG 211, 221

Year level 3

PTG 311, 321

Pass with distinction

A degree (undergraduate) in the School of IT is conferred with distinction on a student who did not repeat any module of his/her final year, obtained a weighted average of at least 75% in all the prescribed modules for the final year, provided that a subminimum of 65% is obtained in each of these modules and provided that the degree is completed in the prescribed minimum period of time. Ad hoc cases will be considered by the Dean, in consultation with the relevant head of department.

Curriculum: Year 1

Minimum credits: 130

Fundamental modules

Academic information management 101 (AIM 101) - Credits: 6.00
Academic information management 111 (AIM 111) - Credits: 4.00
Academic information management 121 (AIM 121) - Credits: 4.00
Academic literacy for Information Technology 121 (ALL 121) - Credits: 6.00
English for specific purposes 118 (ENG 118) - Credits: 12.00
Academic orientation 112 (UPO 112) - Credits: 0.00
Visual culture studies 111 (VKK 111) - Credits: 12.00

Core modules

Marketing management 120 (BEM 120) - Credits: 10.00
Information science 110 (INL 110) - Credits: 12.00
Information science 130 (INL 130) - Credits: 12.00
Information science 140 (INL 140) - Credits: 12.00
Publishing: Introduction to publishing 110 (PUB 110) - Credits: 12.00
Publishing 120 (PUB 120) - Credits: 12.00

Elective modules

Afrikaans 110 (AFR 110) - Credits: 12.00
Afrikaans 120 (AFR 120) - Credits: 12.00
African languages literature: Capita selecta 121 (AFT 121) - Credits: 12.00
German: Cultural-professional (1) 113 (DTS 113) - Credits: 12.00
German: Cultural-professional (2) 123 (DTS 123) - Credits: 12.00
English 110 (ENG 110) - Credits: 12.00
English 120 (ENG 120) - Credits: 12.00
French: Cultural-professional (1) 113 (FRN 113) - Credits: 12.00
French: Cultural-professional (2) 123 (FRN 123) - Credits: 12.00
Introduction to isiNdebele Grammar – Capita selecta 110 (NDE 110) - Credits: 12.00
Introduction to Sepedi grammar - Capita Selecta 111 (SEP 111) - Credits: 12.00
Introduction to isiZulu grammar – Capita selecta 111 (ZUL 111) - Credits: 12.00

Curriculum: Year 2

Minimum credits: 128

Fundamental modules

Community-based project 202 (JCP 202) - Credits: 8.00

Core modules

Information science 240 (INL 240) - Credits: 20.00
Publishing 210 (PUB 210) - Credits: 20.00
Publishing 220 (PUB 220) - Credits: 20.00
Visual culture studies 211 (VKK 211) - Credits: 20.00

Elective modules

Afrikaans 214 (AFR 214) - Credits: 20.00
Afrikaans 220 (AFR 220) - Credits: 20.00
African languages literature: *Capita selecta* 220 (AFT 220) - Credits: 20.00
German: Intermediate (1) 211 (DTS 211) - Credits: 20.00
German: Intermediate (2) 221 (DTS 221) - Credits: 20.00
Modern English literature and English studies 210 (ENG 210) - Credits: 20.00
English 220 (ENG 220) - Credits: 20.00
French: Intermediate (1) 211 (FRN 211) - Credits: 20.00
French: Intermediate (2) 221 (FRN 221) - Credits: 20.00
isiNdebele 210 (NDE 210) - Credits: 20.00
Sepedi grammar – *Capita selecta* 211 (SEP 211) - Credits: 20.00
isiZulu grammar – *Capita selecta* 211 (ZUL 211) - Credits: 20.00

Curriculum: Final year

Minimum credits: 150

Core modules

Publishing 310 (PUB 310) - Credits: 30.00
Publishing 311 (PUB 311) - Credits: 30.00
Publishing 320 (PUB 320) - Credits: 30.00
Publishing 321 (PUB 321) - Credits: 30.00

Elective modules

Afrikaans 311 (AFR 311) - Credits: 30.00
Afrikaans 321 (AFR 321) - Credits: 30.00
African languages literature: *Capita selecta* 320 (AFT 320) - Credits: 30.00
German: Cultural-professional (7) 361 (DTS 361) - Credits: 15.00
German: Cultural-professional (8) 362 (DTS 362) - Credits: 15.00
German: Cultural-professional (9) 363 (DTS 363) - Credits: 15.00
German: Cultural-professional (10) 364 (DTS 364) - Credits: 15.00
English 310 (ENG 310) - Credits: 30.00
English 320 (ENG 320) - Credits: 30.00
French: Cultural-professional (7) 361 (FRN 361) - Credits: 15.00
French: Cultural-professional (8) 362 (FRN 362) - Credits: 15.00
French: Cultural-professional (9) 363 (FRN 363) - Credits: 15.00
French: Cultural-professional (10) 364 (FRN 364) - Credits: 15.00
isiNdebele 310 (NDE 310) - Credits: 30.00
Sepedi 310 (SEP 310) - Credits: 30.00
isiZulu 310 (ZUL 310) - Credits: 30.00

BIT Information Systems (12133300)

Minimum duration of study 3 years

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Programme information

Candidates

The degree is awarded upon successful completion of a minimum of 381 credits, of which 140 are required at first-year level, 121 at second-year level, and 120 at third-year level.

Admission requirements

- The following persons will be considered for admission: candidates who are in possession of a certificate that is deemed by the University to be equivalent to the required Grade 12 certificate with university endorsement; candidates who are graduates from another tertiary institution or have been granted the status of a graduate of such an institution; and candidates who are graduates of another faculty at the University of Pretoria.
- Life Orientation is excluded when calculating the APS.
- Grade 11 results are used in the conditional admission of prospective students.
- A valid qualification with admission to degree studies is required.
- Minimum subject and achievement requirements, as set out below, are required.
- Tuition will be presented in English only.
- Should a candidate obtain an APS of 26 to 29, consideration for admission will be based on the results of the NBT, provided the numbers of students in designated groups have not been reached.

Minimum requirements

Achievement level

English Home Language or English First Additional Language

English Home Language or English First Additional Language		Mathematics		APS
NSC/IEB	AS Level	NSC/IEB	AS Level	
5	C	4	D	30 (26 - 29 admission based on the NBT)

* Cambridge A level candidates who obtained at least a D in the required subjects, will be considered for admission. International Baccalaureate (IB) HL candidates who obtained at least a 4 in the required subjects, will be considered for admission.

Additional requirements

Also consult the G Regulations.

- A student is promoted to the following year of study after obtaining the required credits as mentioned below:
 - Second year of study after obtaining at least 70% of the credits of the first year of study.
 - Third year of study after obtaining at least 70% of the credits of the second year of study.
- The degree is conferred if all the prescribed modules have been passed.

Promotion to next study year

Pass with distinction

Also consult the G Regulations.

- i. A student is promoted to the following year of study after obtaining the required credits as mentioned below:
 - Second year of study after obtaining at least 70% of the credits of the first year of study.
 - Third year of study after obtaining at least 70% of the credits of the second year of study.
- ii. The degree is conferred if all the prescribed modules have been passed.

Curriculum: Year 1

Minimum credits: 136

Choose one elective stream from: Computer Auditing, Information Science, Entrepreneurship, E-Business, Geography, Data Science Management and e-Taxation.

Fundamental modules

[Academic information management 101](#) (AIM 101) - Credits: 6.00

[Academic information management 111](#) (AIM 111) - Credits: 4.00

[Academic information management 121](#) (AIM 121) - Credits: 4.00

[Academic literacy for Information Technology 121](#) (ALL 121) - Credits: 6.00

[Academic orientation 112](#) (UPO 112) - Credits: 0.00

Core modules

[Informatics 112](#) (INF 112) - Credits: 10.00

[Information systems 113](#) (INF 113) - Credits: 10.00

[Informatics 154](#) (INF 154) - Credits: 10.00

[Informatics 164](#) (INF 164) - Credits: 10.00

[Informatics 171](#) (INF 171) - Credits: 20.00

[Business management 114](#) (OBS 114) - Credits: 10.00

[Business management 124](#) (OBS 124) - Credits: 10.00

Elective modules

[Biometry 120](#) (BME 120) - Credits: 16.00

[Economics 110](#) (EKN 110) - Credits: 10.00

[Economics 120](#) (EKN 120) - Credits: 10.00

[Financial accounting 111](#) (FRK 111) - Credits: 10.00

[Financial accounting 121](#) (FRK 121) - Credits: 12.00

[Financial accounting 122](#) (FRK 122) - Credits: 12.00

[Aspects of human geography 156](#) (GGY 156) - Credits: 8.00

[Cartography 110](#) (GMC 110) - Credits: 10.00

[Information science 110](#) (INL 110) - Credits: 12.00

[Information science 120](#) (INL 120) - Credits: 12.00

[Information science 130](#) (INL 130) - Credits: 12.00

[Information science 140](#) (INL 140) - Credits: 12.00

[Statistics 122](#) (STC 122) - Credits: 13.00

[Statistics 110](#) (STK 110) - Credits: 13.00

Curriculum: Year 2

Minimum credits: 121

Choose one elective stream from: Computer Auditing, Information Science, Entrepreneurship, E-Business, Geography, Data Science Management and e-Taxation.

Fundamental modules

[Community-based project 202](#) (JCP 202) - Credits: 8.00

Core modules

[Introduction to moral and political philosophy 251](#) (FIL 251) - Credits: 10.00

[Informatics 214](#) (INF 214) - Credits: 14.00

[Informatics 225](#) (INF 225) - Credits: 14.00

[Informatics 261](#) (INF 261) - Credits: 7.00

[Informatics 271](#) (INF 271) - Credits: 14.00

[Informatics 272](#) (INF 272) - Credits: 14.00

Elective modules

[Taxation 200](#) (BEL 200) - Credits: 32.00

[Financial accounting 211](#) (FRK 211) - Credits: 16.00

[Financial accounting 221](#) (FRK 221) - Credits: 16.00

[Introductory geographic information systems 283](#) (GGY 283) - Credits: 14.00

[Geographic data analysis 220](#) (GIS 220) - Credits: 14.00

[Remote sensing 220](#) (GMA 220) - Credits: 14.00

[Information science 210](#) (INL 210) - Credits: 20.00

[Information science 220](#) (INL 220) - Credits: 20.00

[Internal auditing 211](#) (IOK 211) - Credits: 16.00

[Internal auditing 221](#) (IOK 221) - Credits: 16.00

[Communication management 284](#) (KOB 284) - Credits: 5.00

[Business management 210](#) (OBS 210) - Credits: 16.00

[Design thinking and business innovation 211](#) (OBS 211) - Credits: 16.00

[Business creation 212](#) (OBS 212) - Credits: 10.00

[Responsible management 214](#) (OBS 214) - Credits: 10.00

[Business management 220](#) (OBS 220) - Credits: 16.00

[Statistics 210](#) (STK 210) - Credits: 20.00

[Statistics 220](#) (STK 220) - Credits: 20.00

[Applications in data science 212](#) (WST 212) - Credits: 12.00

Curriculum: Final year

Minimum credits: 120

Choose one elective stream from: Computer Auditing, Information Science, Entrepreneurship, E-Business, Geography, Data Science Management and e-Taxation.

Core modules

Informatics 315 (INF 315) - Credits: 15.00
Informatics 324 (INF 324) - Credits: 15.00
Informatics 354 (INF 354) - Credits: 15.00
Informatics 370 (INF 370) - Credits: 35.00

Elective modules

Taxation 300 (BEL 300) - Credits: 40.00
Geographic information systems 310 (GIS 310) - Credits: 22.00
Spatial analysis 320 (GIS 320) - Credits: 22.00
Information science: Information organisation 310 (INL 310) - Credits: 30.00
Information science: Information and knowledge management 320 (INL 320) - Credits: 30.00
Internal auditing 311 (IOK 311) - Credits: 20.00
Internal auditing 321 (IOK 321) - Credits: 20.00
Business management 310 (OBS 310) - Credits: 20.00
Business management 330 (OBS 330) - Credits: 20.00
International business management 359 (OBS 359) - Credits: 20.00
Business analytics 370 (OBS 370) - Credits: 20.00
Statistics 310 (STK 310) - Credits: 25.00
The science of data analytics 353 (STK 353) - Credits: 25.00

BSc Architecture (12132018)

Minimum duration of study 3 years

Contact Dr N Botes nico.botes@up.ac.za +27 (0)124204600

Programme information

Architecture entails the design of buildings and the spaces between those buildings. Art and science are employed to create liveable environments, that contribute towards the spiritual and material prosperity of the country. Architects are often innovative, critical thinkers that lead and form part of consultant teams. Although they are employed by organisations involved with development, investment, research, marketing, the industry or even education, many architects prefer to be independent consultants and entrepreneurs.

BScArch is regarded as an exit level that enables the graduate to register as a candidate architectural technologist, and BArchHons as candidate senior architectural technologist, at the South African Council for the Architectural Profession. A architectural technologist is a professional person registered by the SACAP in terms of the Act on the Architectural Profession (Act 44 of 2000). Such practitioners provide assistance in the practices of the disciplines of architecture, interior architecture, landscape architecture and urban design where their responsibilities would be the documentation of projects, project administration and site management.

Students are advised to work in the offices of an architect to gain practical experience during the university recesses and during a year out after completion of the BScArch degree.

A graduate wishing to become a professional architect must apply for, and pursue, a further two years of full-time studies in the professional degree programme. The Master of Architecture (Professional) degree is recognised by the South African Council for the Architectural Profession as qualifying the graduate to register as a candidate professional architect in terms of the Act on the Architectural Profession (Act 44 of 2000).

Admission requirements

- The following persons will be considered for admission: candidates who are in possession of a certificate that is deemed by the University to be equivalent to the required Grade 12 certificate with university endorsement; candidates who are graduates from another tertiary institution or have been granted the status of a graduate of such an institution; and candidates who are graduates of another faculty at the University of Pretoria.
- Life Orientation is excluded when calculating the APS.
- Grade 11 results are used in the conditional admission of prospective students.
- A valid qualification with admission to degree studies is required.
- Minimum subject and achievement requirements, as set out below, are required.
- ?BSc (Architecture) will only be considered as first study choice. Selection programme: Selection includes an interview.
- Tuition will be presented in English only.

Minimum requirements

Achievement level

English Home

Language or

English First

Additional

Language

Mathematics

Physical Science

APS

NSC/IEB	AS Level	NSC/IEB	AS Level	NSC/IEB	AS Level	
5	C	4	D	4	D	27

* Cambridge A level candidates who obtained at least a D in the required subjects, will be considered for admission. International Baccalaureate (IB) HL candidates who obtained at least a 4 in the required subjects, will be considered for admission.

Additional requirements

Please Note: Students wishing to transfer to other programmes in the Department of Architecture must obtain written consent from the admissions committee.

Other programme-specific information

Concurrent presentation

In the third year of study Design, Construction, Design communication, Environmental studies and Earth studies must initially be examined in the same year.

The degree is awarded to those students obtaining all the prescribed credits for the programme modules.

Promotion to next study year

A student is promoted to a subsequent year of study after acquiring all the prerequisite module credits of the preceding year of study.

A student is deemed to be in the year of study for which he or she is registered in Design.

If the student is not registered for Design the highest passed year of Design determines the year of study.

Please Note: Students not promoted to the next year of study must obtain the approval of the programme coordinator and the relevant head of department to register for modules in the subsequent year of study.

Students must re-apply for admission to the Department of Architecture in instances where:

-
- i. a student is not promoted to the second year of study;
 - ii. a student after repeating any year of study, is not promoted to the following year of study.

Pass with distinction

The degree is conferred with distinction on a student who, at first registration, passes all modules of the final year of study with a weighted average of 75%. The degree must have been completed within the minimum prescribed time and no supplementary/special examinations may have been written.

Curriculum: Year 1

Minimum credits: 116

Fundamental modules

[Academic information management 102](#) (AIM 102) - Credits: 6.00

[Academic information management 111](#) (AIM 111) - Credits: 4.00

[Academic information management 121](#) (AIM 121) - Credits: 4.00

[Academic orientation 112](#) (UPO 112) - Credits: 0.00

Core modules

[Earth studies 110](#) (AAL 110) - Credits: 8.00

[Digital visual communication 110](#) (ARC 110) - Credits: 6.00

[Construction 111](#) (KON 111) - Credits: 8.00

[Construction 121](#) (KON 121) - Credits: 8.00

[Design communication 120](#) (OKU 120) - Credits: 6.00

[Environmental theory 110](#) (OML 110) - Credits: 6.00

[Environmental studies 120](#) (OML 120) - Credits: 6.00

[Design 100](#) (ONT 100) - Credits: 60.00

Curriculum: Year 2

Minimum credits: 136

Core modules

[Earth studies 210](#) (AAL 210) - Credits: 8.00

[Earth studies 224](#) (AAL 224) - Credits: 4.00

[Geomorphology of the built environment 265](#) (GGY 265) - Credits: 12.00

[Community-based project 201](#) (JCP 201) - Credits: 8.00

[Construction 210](#) (KON 210) - Credits: 8.00

[Construction 220](#) (KON 220) - Credits: 8.00

[Environmental theory 210](#) (OML 210) - Credits: 6.00

[Environmental studies 220](#) (OML 220) - Credits: 6.00

[Design 200](#) (ONT 200) - Credits: 60.00

[Theory of structures 211](#) (STU 211) - Credits: 8.00

[Theory of structures 221](#) (STU 221) - Credits: 8.00

Curriculum: Final year

Minimum credits: 132

Core modules

[Earth studies 320](#) (AAL 320) - Credits: 6.00

Introduction to construction contract law 322 (KKR 322) - Credits: 8.00

Construction 310 (KON 310) - Credits: 12.00

Construction 320 (KON 320) - Credits: 12.00

Design communication 300 (OKU 300) - Credits: 6.00

History of the environment 310 (OMG 310) - Credits: 6.00

History of the environment 320 (OMG 320) - Credits: 6.00

Design 300 (ONT 300) - Credits: 52.00

Practice management 310 (PJS 310) - Credits: 8.00

Theory of structures 311 (STU 311) - Credits: 8.00

Theory of structures 321 (STU 321) - Credits: 8.00

BSc Computer Science (12134001)

Minimum duration of study 3 years

Admission requirements

- The following persons will be considered for admission: candidates who are in possession of a certificate that is deemed by the University to be equivalent to the required Grade 12 certificate with university endorsement; candidates who are graduates from another tertiary institution or have been granted the status of a graduate of such an institution; and candidates who are graduates of another faculty at the University of Pretoria.
- Life Orientation is excluded when calculating the APS.
- Grade 11 results are used in the conditional admission of prospective students.
- A valid qualification with admission to degree studies is required.
- Minimum subject and achievement requirements, as set out below, are required.
- Tuition will be presented in English only.
- Should a candidate obtain an APS of 26 to 29, consideration for admission will be based on the results of the NBT, provided the numbers of students in designated groups have not been reached.

Minimum requirements

Achievement level

English Home Language or English First Additional Language

NSC/IEB	AS Level	NSC/IEB	AS Level
5	C	5	C

Mathematics

APS

30

(26 - 29 admission based on the NBT)

* Cambridge A level candidates who obtained at least a D in the required subjects, will be considered for admission. International Baccalaureate (IB) HL candidates who obtained at least a 4 in the required subjects, will be considered for admission.

Additional requirements

Please note that additional admission requirements may result from certain electives.

Candidates who do not comply with these requirements are advised to register for BSc IT, depending on whether they comply with the admission requirements the programme.

Promotion to next study year

General

- a. A student must pass all the modules of the first year of study, before he or she is permitted to register for any module of the third year of study. Module prerequisites remain applicable. Exceptions to this rule will be considered by the relevant head of department and the Dean.
- b. A student must pass all the modules of the second year of study, before he or she is permitted to register for any module of the fourth year of study (in the case of a four-year degree). Module prerequisites remain applicable. Exceptions to this rule will be considered by the relevant head of department and the Dean.
- c. A new first-year student, who has failed in all the prescribed modules of the programme at the end of the first semester, will not be permitted to proceed to the second semester in the School of Information Technology.
- d. A student who has not passed at least 70% of the credits of the current year of study after the November examinations will not be re-admitted to the School of Information Technology.
- e. Students who fail a module for a second time, forfeit the privilege of registering for any modules of an advanced year of study.
- f. Students whose academic progress is not acceptable can be suspended from further studies.

Procedure: Exclusion from and re-admission to further studies in the School of Information Technology

- a. A student who is excluded from further studies in terms of the stipulations of the abovementioned regulations will be notified in writing by the Dean or admissions committee of the School of Information Technology at the end of the relevant semester.
- b. A student who has been excluded from further studies may apply in writing to the admissions committee of the School of Information Technology on level 6 in the Engineering building I for re-admission.
- c. Written applications for re-admission to the second semester must be submitted at least 7 days before lectures resume for the second semester.
- d. Written applications for re-admission to the new academic year must be submitted before 12 January.
- e. Late applications will be accepted only in exceptional circumstances after approval by the Dean.
- f. Should a student not be re-admitted to further studies by the admissions committee of the School of Information Technology, he/she will be informed in writing.
- g. A student who is not re-admitted by the admissions committee of the School of Information Technology has the right to appeal to the Appeals Committee: Admissions in the Administration building, room 3-13.
- h. Any decision taken by the Appeals Committee: Admissions is final.
 - i. Should the student be re-admitted by the Admissions Committee, strict conditions will be set which the student must comply with in order to proceed with his/her studies.
 - j. A student, who is repeating his or her year, may be permitted by the Dean, on recommendation of the relevant head(s) of department, to register for modules of the following year of study in addition to the outstanding modules he or she has failed, providing that he or she complies with the prerequisites of these modules and no timetable clashes occur. In no semester may the total credits for which a student registers, exceed the normal number of credits per semester by more than 16 credits, except with special permission from the relevant head of department.

Pass with distinction

A degree (undergraduate) in the School of IT is conferred with distinction on a student who did not repeat any module of his/her final year, obtained a weighted average of at least 75% in all the prescribed modules for the final year, provided that a subminimum of 65% is obtained in each of these modules and provided that the degree is completed in the prescribed minimum period of time. Ad hoc cases will be considered by the Dean, in consultation with the relevant head of department.

Curriculum: Year 1

Minimum credits: 174

Students wishing to continue with Mathematics or Mathematical Statistics on year level 2 or 3 need to take WTW114, WTW124 & WTW162. Students not wishing to continue with Mathematics or Mathematical Statistics on year level 2 or 3, need to take WTW152, WTW134, WTW146 and WTW148.

Students are required to choose a science elective as part of the BSc Computer Science first year. The choice is dependent on the Grade 12 Physical Science results. A student who achieved a level 5 in Physical Science in Grade 12 may choose between Physics (PHY 114 and PHY 124) and Chemistry (CMY 117 and CMY 127). A level 4 in Physical Science allows the student to choose Biological Science (MLB 111, BOT 161 and MBY161) and Geology (GLY 155 and GLY 163). A student who does not have Physical Science in Grade 12 has a choice between Physics (PHY131 and SCI154) and Geography (ENV101, GGY156, GGY166 and GMC110).

Students have a choice between Mathematical Statistics (WST 111 and WST 121) and Statistics (STK 110 and STK 120) to fulfil the statistics requirement for the degree programme.

Fundamental modules

[Academic information management 101](#) (AIM 101) - Credits: 6.00

[Academic information management 111](#) (AIM 111) - Credits: 4.00

[Academic information management 121](#) (AIM 121) - Credits: 4.00

[Academic literacy for Information Technology 121](#) (ALL 121) - Credits: 6.00

[Academic orientation 112](#) (UPO 112) - Credits: 0.00

Core modules

[Program design: Introduction 110](#) (COS 110) - Credits: 16.00

[Operating systems 122](#) (COS 122) - Credits: 16.00

[Imperative programming 132](#) (COS 132) - Credits: 16.00

[Introduction to computer science 151](#) (COS 151) - Credits: 8.00

[Calculus 114](#) (WTW 114) - Credits: 16.00

[Discrete structures 115](#) (WTW 115) - Credits: 8.00

[Mathematics 124](#) (WTW 124) - Credits: 16.00

[Mathematics 134](#) (WTW 134) - Credits: 16.00

[Linear algebra 146](#) (WTW 146) - Credits: 8.00

[Calculus 148](#) (WTW 148) - Credits: 8.00

[Mathematical modelling 152](#) (WTW 152) - Credits: 8.00

[Dynamical processes 162](#) (WTW 162) - Credits: 8.00

Elective modules

[Plant biology 161](#) (BOT 161) - Credits: 8.00

[General chemistry 117](#) (CMY 117) - Credits: 16.00

[General chemistry 127](#) (CMY 127) - Credits: 16.00

[Introduction to environmental sciences 101](#) (ENV 101) - Credits: 8.00

[Aspects of human geography 156](#) (GGY 156) - Credits: 8.00

[Southern African geomorphology 166](#) (GGY 166) - Credits: 8.00

[Introduction to geology 155](#) (GLY 155) - Credits: 16.00

[Earth history 163](#) (GLY 163) - Credits: 16.00

[Cartography 110](#) (GMC 110) - Credits: 10.00

[Introduction to microbiology 161](#) (MBY 161) - Credits: 8.00

Molecular and cell biology 111 (MLB 111) - Credits: 16.00
First course in physics 114 (PHY 114) - Credits: 16.00
First course in physics 124 (PHY 124) - Credits: 16.00
Physics for biology students 131 (PHY 131) - Credits: 16.00
Exploring the universe 154 (SCI 154) - Credits: 16.00
Statistics 110 (STK 110) - Credits: 13.00
Statistics 120 (STK 120) - Credits: 13.00
Mathematical statistics 111 (WST 111) - Credits: 16.00
Mathematical statistics 121 (WST 121) - Credits: 16.00

Curriculum: Year 2

Minimum credits: 124

Students have a choice of electives (45 credits) from Computer Science (COS 314, COS 344 and COS 326); Information Science (IMY 310 and IMY 320); Data Science ((STK 210 and STK 220) or (WST 211 and WST 221) at year-level 2 depending on year level 1 Statistics choice) and (STK 353 and COS 314 at year level 3), Mathematics; Mathematical Statistics or Statistics; Physics and Chemistry. The module choices for Mathematics, Mathematical Statistics or Statistics, Physics and Chemistry must be done in consultation with the programme organiser and may require second year elective modules to be included in the degree programme.

Fundamental modules

Community-based project 202 (JCP 202) - Credits: 8.00

Core modules

Theoretical computer science 210 (COS 210) - Credits: 8.00
Data structures and algorithms 212 (COS 212) - Credits: 16.00
Software modelling 214 (COS 214) - Credits: 16.00
Netcentric computer systems 216 (COS 216) - Credits: 16.00
Introduction to database systems 221 (COS 221) - Credits: 16.00
Concurrent systems 226 (COS 226) - Credits: 16.00
Computer organisation and architecture 284 (COS 284) - Credits: 16.00
Discrete structures 285 (WTW 285) - Credits: 12.00

Curriculum: Final year

Minimum credits: 144

Students have a choice of electives (45 credits) from Computer Science (COS 314, COS 344 and COS 326); Information Science (IMY 310 and IMY 320); Data Science ((STK 210 and STK 220) or (WST 211 and WST 221) at year-level 2 depending on year level 1 Statistics choice) and (STK 353 and COS 314 at year level 3), Mathematics; Mathematical Statistics or Statistics; Physics and Chemistry. The module choices for Mathematics, Mathematical Statistics or Statistics, Physics and Chemistry must be done in consultation with the programme organiser and may require second year elective modules to be included in the degree programme.

Core modules

Software engineering 301 (COS 301) - Credits: 27.00
Computer security and ethics 330 (COS 330) - Credits: 18.00
Computer networks 332 (COS 332) - Credits: 18.00
Programming languages 333 (COS 333) - Credits: 18.00
Compiler construction 341 (COS 341) - Credits: 18.00

Elective modules

Physical chemistry 382 (CMY 382) - Credits: 18.00
Analytical chemistry 383 (CMY 383) - Credits: 18.00
Organic chemistry 384 (CMY 384) - Credits: 18.00
Artificial intelligence 314 (COS 314) - Credits: 18.00
Database systems 326 (COS 326) - Credits: 18.00
Computer graphics 344 (COS 344) - Credits: 18.00
Information science: Information organisation 310 (INL 310) - Credits: 30.00
Information science: Information and knowledge management 320 (INL 320) - Credits: 30.00
Information science: Digital repositories 340 (INL 340) - Credits: 30.00
Information science: Socio-political aspects of information in global context 360 (INL 360) - Credits: 30.00
Information science 370 (INL 370) - Credits: 15.00
Information science: Competitive intelligence 380 (INL 380) - Credits: 30.00
Electronics, electromagnetism and quantum mechanics 356 (PHY 356) - Credits: 36.00
Statistical mechanics, solid state physics and modelling 364 (PHY 364) - Credits: 36.00
The science of data analytics 353 (STK 353) - Credits: 25.00
Stochastic processes 312 (WST 312) - Credits: 18.00
Time-series analysis 321 (WST 321) - Credits: 18.00
Actuarial statistics 322 (WST 322) - Credits: 18.00
Financial engineering 354 (WTW 354) - Credits: 18.00
Algebra 381 (WTW 381) - Credits: 18.00
Numerical analysis 383 (WTW 383) - Credits: 18.00
Geometry 389 (WTW 389) - Credits: 18.00

BSc Construction Management (12132025)

Minimum duration of study 3 years

Contact Mr DE Booyens derick.booyens@up.ac.za +27 (0)124204433

Programme information

Construction management is the field of study meant for the person who wishes to become part of the process of infrastructure development, especially the construction of buildings. The construction manager is a professional business person who acts as manager for undertakings in the building, construction and property industry as well as related support services.

Career opportunities cover a wide spectrum and construction managers find employment as main and subcontractors in the building and construction industry, as project managers or investment experts with financial institutions and property developers, as property experts who offer broker services and compile packages, as managers of building and property portfolios for investors, as suppliers of material and equipment to the building and construction industry, as consultants for financial services in the construction and related sectors, or as private entrepreneurs working in these fields.

The examinations of the BScHons degree in Construction Management are recognised by the minister as prescribed examinations in terms of the stipulations as described in the Project and Construction Management Professions Act (Act No 48/2000), as well as by the Chartered Institute of Building.

The degree is awarded if all the prescribed modules have been passed.

Admission requirements

- The following persons will be considered for admission: candidates who are in possession of a certificate that is deemed by the University to be equivalent to the required Grade 12 certificate with university endorsement; candidates who are graduates from another tertiary institution or have been granted the status of a graduate of such an institution; and candidates who are graduates of another faculty at the University of Pretoria.
- Life Orientation is excluded when calculating the APS.
- Grade 11 results are used in the conditional admission of prospective students.
- A valid qualification with admission to degree studies is required.
- Minimum subject and achievement requirements, as set out below, are required.
- BSc (Construction Management) is a selection programme.
- Tuition will be presented in English only.

Minimum requirements

Achievement level

English Home

Language or

English First

Additional

Language

NSC/IEB

AS Level

Mathematics

NSC/IEB

AS Level

Physical Science or Accounting

NSC/IEB

AS Level

APS

5

C

5

C

4

D

30

* Cambridge A level candidates who obtained at least a D in the required subjects, will be considered for admission. International Baccalaureate (IB) HL candidates who obtained at least a 4 in the required subjects, will be considered for admission.

Promotion to next study year

Promotion to the second semester of the first year and to the second year of study

- a. A newly registered first-year student who failed all the prescribed modules for the programme at the end of the first semester shall not be readmitted to the School for the Built Environment in the second semester.
- b. A student who complies with all the requirements of the first year of study, or has at least obtained 110 credits, is promoted to the second year of study.
- c. A student who has not obtained at least 70% of the credits of the first year of study after the November examinations must reapply for admission should he/she intend to continue with his/her studies. Written application must be submitted to the student administration of the School for the Built Environment no later than 12 January. Late applications will be accepted only in exceptional circumstances after approval by the Dean and conditions of readmission as determined by the admissions committee shall apply should first-year students be readmitted.
- d. Students who have not passed all the prescribed modules of the first year of study, as well as students who are readmitted in terms of (c) must register for the outstanding modules of the first year.
- e. A student who is repeating his/her first year, may, on recommendation of the relevant head of department and with the approval of the Dean, be permitted to enrol for modules of the second year of study in addition to the first-year modules which he or she failed, providing that he or she complies with the prerequisites for the second-year modules and that no timetable clashes occur. The number of credits per semester for which a student registers may not exceed the prescribed number of credits per semester by more than 16 credits.

Promotion to the third year of study

- a. A student who complies with all the requirements of the second year of study, or has at least obtained 230

-
- credits, is promoted to the third year of study provided that no first year module(s) are outstanding.
- b. The Dean may, on the recommendation of the Head of Department, allow a student, who qualifies for promotion to a subsequent year of study, but who has not passed all the modules of that year, to carry over those modules to the next or a later year.
 - c. The number of credits per semester for which a student registers may not exceed the prescribed number of credits per semester by more than 16 credits and the prerequisites must be met.
 - d. A student who complies with all the requirements for the degree with the exception of one year module or two semester modules, in which a final mark of at least 40% has been obtained, may be admitted to a special examination in the module(s) concerned, at the start of the ensuing semester.
 - e. On the recommendation of the Head of Department, in exceptional circumstances deviation from the abovementioned stipulations, may be approved by the Faculty Executive Committee, provided that no timetable clashes occur.

Pass with distinction

The degree is conferred with distinction on a student:

- i. if no module of the second and third study year was repeated and a weighted average of at least 75% was obtained in one year in all the modules (excluding JCP 201), of the final study year;
- ii. the degree programme was completed within the prescribed three study years, and the final study year modules were passed on first registration without any supplementary or special examinations.

Curriculum: Year 1

Minimum credits: 126

Fundamental modules

Academic information management 111 (AIM 111) - Credits: 4.00

Academic information management 121 (AIM 121) - Credits: 4.00

Academic literacy for Construction Economics 122 (ALL 122) - Credits: 6.00

Academic orientation 112 (UPO 112) - Credits: 0.00

Core modules

Building organisation 121 (BGG 121) - Credits: 4.00

Building drawings 111 (BOU 111) - Credits: 4.00

Building science 110 (BWT 110) - Credits: 8.00

Building science 120 (BWT 120) - Credits: 8.00

Economics 110 (EKN 110) - Credits: 10.00

Economics 120 (EKN 120) - Credits: 10.00

Building services 112 (GBD 112) - Credits: 6.00

Building services 122 (GBD 122) - Credits: 6.00

Quantities 101 (HVV 101) - Credits: 24.00

Introduction to structures 110 (SKE 110) - Credits: 8.00

Structures 120 (SKE 120) - Credits: 8.00

Mathematics 134 (WTW 134) - Credits: 16.00

Curriculum: Year 2

Minimum credits: 121

Core modules

Building science 210 (BWT 210) - Credits: 12.00
Building science 220 (BWT 220) - Credits: 8.00
Property law 222 (EOW 222) - Credits: 8.00
Financial management 110 (FBS 110) - Credits: 10.00
Building services 211 (GBD 211) - Credits: 6.00
Building services 221 (GBD 221) - Credits: 6.00
Community-based project 201 (JCP 201) - Credits: 8.00
Construction quantities 201 (KSH 201) - Credits: 24.00
Civil engineering services 220 (SKE 220) - Credits: 8.00
Statistics 110 (STK 110) - Credits: 13.00
Statistics 161 (STK 161) - Credits: 6.00
Site surveying 213 (TRN 213) - Credits: 12.00

Curriculum: Final year

Minimum credits: 146

Core modules

Labour law 311 (ABR 311) - Credits: 20.00
Business law 310 (BER 310) - Credits: 10.00
Housing 320 (BHU 320) - Credits: 6.00
Building science 310 (BWT 310) - Credits: 10.00
Building science 320 (BWT 320) - Credits: 8.00
Financial management 210 (FBS 210) - Credits: 16.00
Financial management 361 (FBS 361) - Credits: 10.00
Building services 311 (GBD 311) - Credits: 6.00
Construction management 310 (KBS 310) - Credits: 10.00
Construction management 320 (KBS 320) - Credits: 10.00
Introduction to construction contract law 322 (KKR 322) - Credits: 8.00
Construction quantities 300 (KSH 300) - Credits: 24.00
Sustainable construction 320 (VKN 320) - Credits: 8.00

BSc Information and Knowledge Systems (12133213)

Minimum duration of study 3 years

Admission requirements

- The following persons will be considered for admission: candidates who are in possession of a certificate that is deemed by the University to be equivalent to the required Grade 12 certificate with university endorsement; candidates who are graduates from another tertiary institution or have been granted the status of a graduate of such an institution; and candidates who are graduates of another faculty at the University of Pretoria.
- Life Orientation is excluded when calculating the APS.
- Grade 11 results are used in the conditional admission of prospective students.
- A valid qualification with admission to degree studies is required.
- Minimum subject and achievement requirements, as set out below, are required.
- Tuition will be presented in English only.
- Should a candidate obtain an APS of 26 to 29, consideration for admission will be based on the results of the

NBT, provided the numbers of students in designated groups have not been reached.

Minimum requirements

Achievement level

English Home Language or English First Additional Language

NSC/IEB	AS Level	NSC/IEB	AS Level
4	D	5	C

APS

30
(26 - 29 admission based on the NBT)

* Cambridge A level candidates who obtained at least a D in the required subjects, will be considered for admission. International Baccalaureate (IB) HL candidates who obtained at least a 4 in the required subjects, will be considered for admission.

Promotion to next study year

General

- A student must pass all the modules of the first year of study, before he or she is permitted to register for any module of the third year of study. Module prerequisites remain applicable. Exceptions to this rule will be considered by the relevant head of department and the Dean.
- A student must pass all the modules of the second year of study, before he or she is permitted to register for any module of the fourth year of study (in the case of a four-year degree). Module prerequisites remain applicable. Exceptions to this rule will be considered by the relevant head of department and the Dean.
- A new first-year student, who has failed in all the prescribed modules of the programme at the end of the first semester, will not be permitted to proceed to the second semester in the School of Information Technology.
- A student who has not passed at least 70% of the credits of the current year of study after the November examinations will not be re-admitted to the School of Information Technology.
- Students who fail a module for a second time, forfeit the privilege of registering for any modules of an advanced year of study.
- Students whose academic progress is not acceptable can be suspended from further studies.

Procedure: Exclusion from and re-admission to further studies in the School of Information Technology

- A student who is excluded from further studies in terms of the stipulations of the abovementioned regulations will be notified in writing by the Dean or admissions committee of the School of Information Technology at the end of the relevant semester.
- A student who has been excluded from further studies may apply in writing to the admissions committee of the School of Information Technology on level 6 in the Engineering building I for re-admission.
- Written applications for re-admission to the second semester must be submitted at least 7 days before lectures resume for the second semester.
- Written applications for re-admission to the new academic year must be submitted before 12 January.
- Late applications will be accepted only in exceptional circumstances after approval by the Dean.
- Should a student not be re-admitted to further studies by the admissions committee of the School of Information Technology, he/she will be informed in writing.
- A student who is not re-admitted by the admissions committee of the School of Information Technology has the right to appeal to the Appeals Committee: Admissions in the Administration building, room 3-13.
- Any decision taken by the Appeals Committee: Admissions is final.
- Should the student be re-admitted by the Admissions Committee, strict conditions will be set which the

student must comply with in order to proceed with his/her studies.

- j. A student, who is repeating his or her year, may be permitted by the Dean, on recommendation of the relevant head(s) of department, to register for modules of the following year of study in addition to the outstanding modules he or she has failed, providing that he or she complies with the prerequisites of these modules and no timetable clashes occur. In no semester may the total credits for which a student registers, exceed the normal number of credits per semester by more than 16 credits, except with special permission from the relevant head of department.

Pass with distinction

A degree (undergraduate) in the School of IT is conferred with distinction on a student who did not repeat any module of his/her final year, obtained a weighted average of at least 75% in all the prescribed modules for the final year, provided that a subminimum of 65% is obtained in each of these modules and provided that the degree is completed in the prescribed minimum period of time. Ad hoc cases will be considered by the Dean, in consultation with the relevant head of department.

Curriculum: Year 1

Minimum credits: 140

Students are required to choose their electives from what is referred to as an elective group. Once an elective group has been chosen, the modules listed per year level need to be completed in order to comply with the requirements of the degree programme. These elective groups, along with their respective first year modules are:

- Data Science (WTW 146, WTW 148, WTW 152, STK 110 and STK 120)
- Genetics (BME 120, BOT 161, GTS 161, MBY 161, MLB 111 and WTW 146)
- Geographical Information Systems (GGY 156, ENV 101, GGY 166, GMC 110, STK 110 and WTW 146)
- IT and Enterprises (BEM 120, OBS 114, OBS 124 and STK 110)
- IT and Law (KRG 110, KRG 120, KRM 110 and KRM 120)
- IT and Music (MGS 110, MGS 120, MPE 170, MCS 200, WTW 146 and WTW 148)
- Software Development (INF 154, INF 164 and INF 171)

Fundamental modules

[Academic information management 101](#) (AIM 101) - Credits: 6.00

[Academic information management 111](#) (AIM 111) - Credits: 4.00

[Academic information management 121](#) (AIM 121) - Credits: 4.00

[Academic literacy for Information Technology 121](#) (ALL 121) - Credits: 6.00

[Academic orientation 112](#) (UPO 112) - Credits: 0.00

Core modules

[Program design: Introduction 110](#) (COS 110) - Credits: 16.00

[Operating systems 122](#) (COS 122) - Credits: 16.00

[Imperative programming 132](#) (COS 132) - Credits: 16.00

[Introduction to computer science 151](#) (COS 151) - Credits: 8.00

[Discrete structures 115](#) (WTW 115) - Credits: 8.00

[Mathematics 134](#) (WTW 134) - Credits: 16.00

Elective modules

Marketing management 120 (BEM 120) - Credits: 10.00
Biometry 120 (BME 120) - Credits: 16.00
Plant biology 161 (BOT 161) - Credits: 8.00
Introduction to environmental sciences 101 (ENV 101) - Credits: 8.00
Financial accounting 122 (FRK 122) - Credits: 12.00
Aspects of human geography 156 (GGY 156) - Credits: 8.00
Southern African geomorphology 166 (GGY 166) - Credits: 8.00
Cartography 110 (GMC 110) - Credits: 10.00
Introductory genetics 161 (GTS 161) - Credits: 8.00
Informatics 154 (INF 154) - Credits: 10.00
Informatics 164 (INF 164) - Credits: 10.00
Informatics 171 (INF 171) - Credits: 20.00
Commercial law 110 (KRG 110) - Credits: 10.00
Commercial law 120 (KRG 120) - Credits: 10.00
Criminology 110 (KRM 110) - Credits: 12.00
Criminology 120 (KRM 120) - Credits: 12.00
Introduction to microbiology 161 (MBY 161) - Credits: 8.00
Music technology 200 (MCS 200) - Credits: 12.00
Musicology 100 (MGS 100) - Credits: 20.00
Molecular and cell biology 111 (MLB 111) - Credits: 16.00
Business management 114 (OBS 114) - Credits: 10.00
Business management 124 (OBS 124) - Credits: 10.00
Statistics 110 (STK 110) - Credits: 13.00
Statistics 120 (STK 120) - Credits: 13.00
Mathematical statistics 111 (WST 111) - Credits: 16.00
Mathematical statistics 121 (WST 121) - Credits: 16.00
Numerical analysis 123 (WTW 123) - Credits: 8.00
Linear algebra 146 (WTW 146) - Credits: 8.00
Calculus 148 (WTW 148) - Credits: 8.00
Mathematical modelling 152 (WTW 152) - Credits: 8.00

Curriculum: Year 2

Minimum credits: 170

Students must continue with the elective groups they chose in first year. The modules associated with each of the elective groups are the following:

- Data Science (STK 210 and STK 220)
- Genetics (GTS 251, GTS 261, MBY 251 and MBY 261)
- Geographical Information Systems (GGY 283, GIS 220 and GMA 220)
- IT and Enterprises (BEM 212, FIL 251, OBS 210 and OBS 220)
- IT and Law (KRG 200, KRM 210 and KRM 220)
- IT and Music (MPE 270 and MCS 302)
- Software Development (INF 272, IMY 210 and IMY 220)

Fundamental modules

Community-based project 202 (JCP 202) - Credits: 8.00

Core modules

Theoretical computer science 210 (COS 210) - Credits: 8.00
Data structures and algorithms 212 (COS 212) - Credits: 16.00
Software modelling 214 (COS 214) - Credits: 16.00
Netcentric computer systems 216 (COS 216) - Credits: 16.00
Introduction to database systems 221 (COS 221) - Credits: 16.00
Concurrent systems 226 (COS 226) - Credits: 16.00
Computer organisation and architecture 284 (COS 284) - Credits: 16.00
Discrete structures 285 (WTW 285) - Credits: 12.00

Elective modules

Consumer behaviour 212 (BEM 212) - Credits: 16.00
Introductory geographic information systems 283 (GGY 283) - Credits: 14.00
Geographic data analysis 220 (GIS 220) - Credits: 14.00
Remote sensing 220 (GMA 220) - Credits: 14.00
Molecular genetics 251 (GTS 251) - Credits: 12.00
Genetic diversity and evolution 261 (GTS 261) - Credits: 12.00
Multimedia 210 (IMY 210) - Credits: 16.00
Multimedia 220 (IMY 220) - Credits: 16.00
Informatics 272 (INF 272) - Credits: 14.00
Commercial law 200 (KRG 200) - Credits: 24.00
Criminology 210 (KRM 210) - Credits: 20.00
Criminology 220 (KRM 220) - Credits: 20.00
Bacteriology 251 (MBY 251) - Credits: 12.00
Mycology 261 (MBY 261) - Credits: 12.00
Music technology 302 (MCS 302) - Credits: 18.00
Business management 210 (OBS 210) - Credits: 16.00
Business management 220 (OBS 220) - Credits: 16.00
Statistics 210 (STK 210) - Credits: 20.00
Statistics 220 (STK 220) - Credits: 20.00

Curriculum: Final year

Minimum credits: 144

As with the 2nd year elective modules, the 3rd year elective modules follow on from the elective group chosen in first year. The modules for 3rd year, given per elective group are the following:

- Data Science (COS 314, COS 326 and STK353)
- Genetics (COS314 and (COS 326 and COS 344) or (GTS 354 and GTS 367) or (GTS354 and BTC 361))
- Geographical Information Systems (COS 326, COS 344, GIS 310 and GIS 320)
- IT and Enterprises ((OBS 359 and OBS 369) or (OBS310 and OBS 320))
- IT and Law (KRM 310, KRM 320 and KUB 420)
- IT and Music (Another 3rd year COS module (either COS 314, COS 326, COS 344 or COS 341) and MCS 402)
- Software Development (COS 326 and INF 354)

Core modules

Software engineering 301 (COS 301) - Credits: 27.00
Computer security and ethics 330 (COS 330) - Credits: 18.00
Computer networks 332 (COS 332) - Credits: 18.00

Programming languages 333 (COS 333) - Credits: 18.00

Multimedia 310 (IMY 310) - Credits: 30.00

Elective modules

Plant genetics and crop biotechnology 361 (BTC 361) - Credits: 18.00

Artificial intelligence 314 (COS 314) - Credits: 18.00

Database systems 326 (COS 326) - Credits: 18.00

Computer graphics 344 (COS 344) - Credits: 18.00

Geographic information systems 310 (GIS 310) - Credits: 22.00

Spatial analysis 320 (GIS 320) - Credits: 22.00

Genome evolution and phylogenetics 354 (GTS 354) - Credits: 18.00

Population and evolutionary genetics 367 (GTS 367) - Credits: 18.00

Informatics 354 (INF 354) - Credits: 15.00

Information and communications technology law 420 (KUB 420) - Credits: 10.00

Music technology 402 (MCS 402) - Credits: 40.00

Business management 310 (OBS 310) - Credits: 20.00

Business management 320 (OBS 320) - Credits: 20.00

International business management 359 (OBS 359) - Credits: 20.00

International business management 369 (OBS 369) - Credits: 20.00

BSc Interior Architecture (12132020)

Minimum duration of study 3 years

Contact

Dr N Botes nico.botes@up.ac.za +27 (0)124204600

Ms Z Khan u29159475@tuks.co.za +27 (0)124203765

Programme information

Interior architecture is the art and science of the design of designated spaces. It focuses on the needs of the user and the harmony between architectural spaces and the detailed design of spaces and life-style products.

Graduates will have the ability to design interiors and products. Attention is given to the design process, building and material technology, building climate, ergonomics, history and visual communication within the context of society, economics, politics and technology. It is very important that students have the ability to visualise spaces, think three-dimensionally and solve problems creatively.

Students are advised to work in the offices of an architect or an interior architect during the university recesses to gain practical experience.

It is recommended that those graduates wishing to become professional Interior architects must hereafter apply to register for the BIntHons degree (one year full-time) and the MInt(Prof) degree (one year full-time). Those candidates wishing to become interior and product designers must hereafter register for the one year full-time honours degree programme in Interior Architecture [BIntHons].

Admission requirements

- The following persons will be considered for admission: candidates who are in possession of a certificate that is deemed by the University to be equivalent to the required Grade 12 certificate with university endorsement; candidates who are graduates from another tertiary institution or have been granted the status of a graduate of such an institution; and candidates who are graduates of another faculty at the University of Pretoria.

- Life Orientation is excluded when calculating the APS.
- Grade 11 results are used in the conditional admission of prospective students.
- A valid qualification with admission to degree studies is required.
- Minimum subject and achievement requirements, as set out below, are required.
- ?BSc (Interior Architecture) will only be considered as first study choice. Selection programme: Selection includes an interview.
- Tuition will be presented in English only.

Minimum requirements

Achievement level

English Home

Language or

English First

Additional

Language

		Mathematics		Physical Science		APS
NSC/IEB	AS Level	NSC/IEB	AS Level	NSC/IEB	AS Level	
5	C	4	D	4	D	27

* Cambridge A level candidates who obtained at least a D in the required subjects, will be considered for admission. International Baccalaureate (IB) HL candidates who obtained at least a 4 in the required subjects, will be considered for admission.

Additional requirements

Students wishing to transfer to other programmes in the Department of Architecture must obtain written consent from the admissions committee.

Other programme-specific information

Concurrent presentation

In the third year of study Design, Construction, Design communication, Environmental studies, Earth studies and Material studies must initially be examined in the same year.

Awarding of degree

The degree is awarded to those students who have obtained all the prescribed credits for the programme modules.

Promotion to next study year

A student is promoted to a subsequent year of study after acquiring all the prerequisite module credits of the preceding year of study. A student is deemed to be in the year of study for which he or she is registered in Design.

If the student is not registered for Design the highest passed year of Design determines the year of study.

Please Note: Students not promoted to the next year of study must obtain the approval of the programme coordinator and the Head of Department to register for modules in the subsequent year of study. Students must re-apply for admission to the Department of Architecture in instances where:

- a student is not promoted to the second year of study;
- a student after repeating any year of study, is not promoted to the following year of study.

Pass with distinction

The degree is conferred with distinction on a student who, at first registration, simultaneously passes both Design 303 and Construction 320 with distinction (75%) with the proviso that the degree is completed within the minimum prescribed time and all other final-year modules are passed on first registration without any supplementary/special examinations.

Curriculum: Year 1

Minimum credits: 116

Fundamental modules

Academic information management 102 (AIM 102) - Credits: 6.00

Academic information management 111 (AIM 111) - Credits: 4.00

Academic information management 121 (AIM 121) - Credits: 4.00

Academic orientation 112 (UPO 112) - Credits: 0.00

Core modules

Earth studies 110 (AAL 110) - Credits: 8.00

Digital visual communication 110 (ARC 110) - Credits: 6.00

Construction 111 (KON 111) - Credits: 8.00

Construction 121 (KON 121) - Credits: 8.00

Design communication 120 (OKU 120) - Credits: 6.00

Environmental theory 110 (OML 110) - Credits: 6.00

Environmental studies 120 (OML 120) - Credits: 6.00

Design 100 (ONT 100) - Credits: 60.00

Curriculum: Year 2

Minimum credits: 134

Core modules

Earth studies 210 (AAL 210) - Credits: 8.00

Earth studies 223 (AAL 223) - Credits: 4.00

Earth studies 224 (AAL 224) - Credits: 4.00

Community-based project 201 (JCP 201) - Credits: 8.00

Construction 210 (KON 210) - Credits: 8.00

Construction 220 (KON 220) - Credits: 8.00

Material studies 223 (MST 223) - Credits: 8.00

Environmental theory 210 (OML 210) - Credits: 6.00

Environmental studies 220 (OML 220) - Credits: 6.00

Design 203 (ONT 203) - Credits: 60.00

Textiles: Utilities, fibres and yarns 212 (TKS 212) - Credits: 14.00

Curriculum: Final year

Minimum credits: 132

Core modules

Earth studies 320 (AAL 320) - Credits: 6.00

Introduction to construction contract law 322 (KKR 322) - Credits: 8.00

Construction 310 (KON 310) - Credits: 12.00

Construction 320 (KON 320) - Credits: 12.00
Material studies 313 (MST 313) - Credits: 8.00
Material studies 323 (MST 323) - Credits: 8.00
Design communication 300 (OKU 300) - Credits: 6.00
History of the environment 310 (OMG 310) - Credits: 6.00
History of the environment 320 (OMG 320) - Credits: 6.00
Design 303 (ONT 303) - Credits: 52.00
Practice management 310 (PJS 310) - Credits: 8.00

BSc Landscape Architecture (12132019)

Minimum duration of study 3 years

Contact	Dr N Botes	nico.botes@up.ac.za	+27 (0)124204600
	Dr DL Shand	dayle.shand@up.ac.za	+27 (0)124205533

Programme information

Landscape architecture is the science and art of the design of outside areas for the use and enjoyment of people. Parks, game reserves, recreational areas and marinas are only a few of the environments which the landscape architect designs. They create urban oases in the form of plazas and pedestrian routes, and design environments around shopping centres and residential developments. The landscape architect can join a private firm, start an own business, or accept employment in central, provincial or local government in departments that handle water usage and research, forestry, environmental matters, sport, recreational and fishing areas, and nature conservation.

Students are advised to work in the offices of an architect or a landscape architect to gain practical experience during the university recesses.

BScLArch is a three-year degree and is regarded as an exit level that enables the graduate to register as a candidate landscape architectural technologist who is a professional person registered by the South African Council of the Landscape Architectural Profession in terms of the Act on the Landscape Architectural Profession (Act 45 of 2000). Such practitioners provide assistance in the practices of the disciplines of landscape architecture and urban design where their responsibilities would be the documentation of projects, project administration and site management. Candidates wishing to become professional landscape architects must hereafter apply to register for the BLHons degree (one year full-time), and thereafter the ML(Prof) degree (one year full-time).

Admission requirements

- The following persons will be considered for admission: candidates who are in possession of a certificate that is deemed by the University to be equivalent to the required Grade 12 certificate with university endorsement; candidates who are graduates from another tertiary institution or have been granted the status of a graduate of such an institution; and candidates who are graduates of another faculty at the University of Pretoria.
- Life Orientation is excluded when calculating the APS.
- Grade 11 results are used in the conditional admission of prospective students.
- A valid qualification with admission to degree studies is required.
- Minimum subject and achievement requirements, as set out below, are required.
- Selection programme: Selection includes an interview.

- Tuition will be presented in English only.

Minimum requirements

Achievement level

English Home

Language or

English First

Additional

Language

NSC/IEB

AS Level

Mathematics

NSC/IEB

AS Level

Physical Science or Geography or Life Sciences

NSC/IEB

AS Level

APS

5

C

4

D

4

D

27

* Cambridge A level candidates who obtained at least a D in the required subjects, will be considered for admission. International Baccalaureate (IB) HL candidates who obtained at least a 4 in the required subjects, will be considered for admission.

Additional requirements

Please Note: Students wishing to transfer to other programmes in the Department of Architecture must obtain written consent from the admissions committee.

Other programme-specific information

Concurrent presentation

In the third year of study Design, Construction, Environmental studies, Plant science and Earth studies must be examined in the same year.

Awarding of degree

The degree is awarded to those students who have obtained all the prescribed credits for the programme modules.

Promotion to next study year

A student is promoted to a subsequent year of study after acquiring all the prerequisite module credits of the preceding year of study.

A student is deemed to be in the year of study for which he or she is registered in Design.

If the student is not registered for Design the highest passed year of Design determines the year of study.

Please Note: Students not promoted to the next year of study must obtain the approval of the programme co-ordinator and the head of department to register for modules in the subsequent year of study. Students must re-apply for admission to the Department of Architecture in instances where:

- a student is not promoted to the second year of study;
- a student after repeating any year of study, is not promoted to the following year of study.

Pass with distinction

The BScLArch degree is conferred with distinction on a student who, at first registration, simultaneously passes Design 302 and Construction 320 with distinction (75%) with the proviso that the degree is completed within the minimum prescribed time and all other final-year modules are passed on first registration without any supplementary/special examinations.

Curriculum: Year 1

Minimum credits: 116

Fundamental modules

Academic information management 102 (AIM 102) - Credits: 6.00

Academic information management 111 (AIM 111) - Credits: 4.00

Academic information management 121 (AIM 121) - Credits: 4.00

Academic orientation 112 (UPO 112) - Credits: 0.00

Core modules

Earth studies 110 (AAL 110) - Credits: 8.00

Digital visual communication 110 (ARC 110) - Credits: 6.00

Construction 111 (KON 111) - Credits: 8.00

Construction 121 (KON 121) - Credits: 8.00

Design communication 120 (OKU 120) - Credits: 6.00

Environmental theory 110 (OML 110) - Credits: 6.00

Environmental studies 120 (OML 120) - Credits: 6.00

Design 100 (ONT 100) - Credits: 60.00

Curriculum: Year 2

Minimum credits: 144

Core modules

Earth studies 210 (AAL 210) - Credits: 8.00

Geomorphology of the built environment 265 (GGY 265) - Credits: 12.00

Introductory soil science 250 (GKD 250) - Credits: 12.00

Community-based project 201 (JCP 201) - Credits: 8.00

Construction 210 (KON 210) - Credits: 8.00

Construction 220 (KON 220) - Credits: 8.00

Landscape architecture 212 (LAN 212) - Credits: 8.00

Landscape architecture 222 (LAN 222) - Credits: 8.00

Environmental theory 210 (OML 210) - Credits: 6.00

Environmental studies 220 (OML 220) - Credits: 6.00

Design 202 (ONT 202) - Credits: 60.00

Curriculum: Final year

Minimum credits: 132

Core modules

Earth studies 320 (AAL 320) - Credits: 6.00

Introduction to construction contract law 322 (KKR 322) - Credits: 8.00

Construction 310 (KON 310) - Credits: 12.00

Construction 320 (KON 320) - Credits: 12.00

Design communication 300 (OKU 300) - Credits: 6.00

History of the environment 310 (OMG 310) - Credits: 6.00

History of the environment 320 (OMG 320) - Credits: 6.00

Design 302 (ONT 302) - Credits: 52.00

Practice management 310 (PJS 310) - Credits: 8.00

Plant science 312 (PWT 312) - Credits: 8.00

Plant science 322 (PWT 322) - Credits: 8.00

BSc Quantity Surveying (12132023)

Minimum duration of study 3 years

Contact Dr DJ Hoffman danie.hoffman@up.ac.za +27 (0)124202551

Programme information

Quantity surveying is the science that delivers specialised financial and contractual services and advice to clients in the building and construction industry, as well as in related industries. The quantity surveyor is an independent and professional consultant who works with architects, consulting engineers, and the building contractor, in order to protect the interests of the client, while at the same time also looking after the interests of the contractor and subcontractors.

The student could enter the building or construction industry as a candidate quantity surveyor after he/she has completed the three-year degree. Such qualification, however, would not allow the person to register as a professional quantity surveyor without acquiring additional qualifications. After completing the honours programme the opportunities become far wider, and application can be made for registration as a professional quantity surveyor with the South African Council for the Quantity Surveying Profession, after further assessment and furnishing of evidence, in compliance with the prescribed competencies. Employment opportunities in the building and construction sector, government departments, in the property sector, banks and manufacturing industry exist for such registered quantity surveyors. Most, however, work in the private sector where they become employees/ partners/ directors of quantity surveying practices, or open their own practices.

The examinations for the BScHons degree in Quantity Surveying are approved by the Minister as prescribed examinations in terms of the stipulations of the Quantity Surveying Profession Act (Act No. 49/2000), as well as by the Royal Institution of Chartered Surveyors.

Admission requirements

- The following persons will be considered for admission: candidates who are in possession of a certificate that is deemed by the University to be equivalent to the required Grade 12 certificate with university endorsement; candidates who are graduates from another tertiary institution or have been granted the status of a graduate of such an institution; and candidates who are graduates of another faculty at the University of Pretoria.
- Life Orientation is excluded when calculating the APS.
- Grade 11 results are used in the conditional admission of prospective students.
- A valid qualification with admission to degree studies is required.
- Minimum subject and achievement requirements, as set out below, are required.
- BSc (Quantity Surveying) is a selection programme.
- Tuition will be presented in English only.

Minimum requirements

Achievement level

English Home Language or English First Additional Language		Mathematics		Physical Science or Accounting		APS
NSC/IEB	AS Level	NSC/IEB	AS Level	NSC/IEB	AS Level	
5	C	5	C	4	D	30

* Cambridge A level candidates who obtained at least a D in the required subjects, will be considered for admission. International Baccalaureate (IB) HL candidates who obtained at least a 4 in the required subjects, will be considered for admission.

Other programme-specific information

Please Note: Students with Maths 4, should take STK 113 and STK 123 (instead of STK 110) during their first year of study and STK 120 during their second year of study.

The degree is awarded if all the prescribed modules have been passed.

Promotion to next study year

Promotion to the second semester of the first year and to the second year of study

- A newly registered first-year student who failed all the prescribed modules for the programme at the end of the first semester shall not be readmitted to the School for the Built Environment in the second semester.
- A student who complies with all the requirements of the first year of study, or has at least obtained 110 credits, is promoted to the second year of study.
- A student who has not obtained at least 70% of the credits of the first year of study after the November examinations must reapply for admission should he/she intend to continue with his/her studies. Written application must be submitted to the student administration of the School for the Built Environment no later than 12 January. Late applications will be accepted only in exceptional circumstances after approval by the Dean and conditions of readmission as determined by the admissions committee shall apply should first-year students be readmitted.
- Students who have not passed all the prescribed modules of the first year of study, as well as students who are readmitted in terms of (c) must register for the outstanding modules of the first year.
- A student who is repeating his/her first year, may, on recommendation of the relevant head of department and with the approval of the Dean, be permitted to enrol for modules of the second year of study in addition to the first-year modules which he or she failed, providing that he or she complies with the prerequisites for the second-year modules and that no timetable clashes occur. The number of credits per semester for which a student registers may not exceed the prescribed number of credits per semester by more than 16 credits.

Promotion to the third year of study

- A student who complies with all the requirements of the second year of study, or has at least obtained 230 credits, is promoted to the third year of study provided that no first year module(s) are outstanding.
- The Dean may, on the recommendation of the Head of Department, allow a student, who qualifies for promotion to a subsequent year of study, but who has not passed all the modules of that year, to carry over those modules to the next or a later year.
- The number of credits per semester for which a student registers may not exceed the prescribed number of credits per semester by more than 16 credits and the prerequisites must be met.
- A student who complies with all the requirements for the degree with the exception of one year module or two semester modules, in which a final mark of at least 40% has been obtained, may be admitted to a special

-
- examination in the module(s) concerned, at the start of the ensuing semester.
- e. On the recommendation of the Head of Department, in exceptional circumstances deviation from the abovementioned stipulations, may be approved by the Faculty Executive Committee, provided that no timetable clashes occur.

Pass with distinction

The degree is conferred with distinction on a student:

- if no module of the second and third study year was repeated and a weighted average of at least 75% was obtained in one year in all the modules (excluding JCP 201), of the final study year;
- the degree programme was completed within the prescribed three study years, and the final study year modules were passed on first registration without any supplementary or special examinations.

Curriculum: Year 1

Minimum credits: 126

Fundamental modules

Academic information management 111 (AIM 111) - Credits: 4.00

Academic information management 121 (AIM 121) - Credits: 4.00

Academic literacy for Construction Economics 122 (ALL 122) - Credits: 6.00

Academic orientation 112 (UPO 112) - Credits: 0.00

Core modules

Building organisation 121 (BGG 121) - Credits: 4.00

Building drawings 111 (BOU 111) - Credits: 4.00

Building science 110 (BWT 110) - Credits: 8.00

Building science 120 (BWT 120) - Credits: 8.00

Economics 110 (EKN 110) - Credits: 10.00

Economics 120 (EKN 120) - Credits: 10.00

Building services 112 (GBD 112) - Credits: 6.00

Building services 122 (GBD 122) - Credits: 6.00

Quantities 101 (HVH 101) - Credits: 24.00

Introduction to structures 110 (SKE 110) - Credits: 8.00

Structures 120 (SKE 120) - Credits: 8.00

Mathematics 134 (WTW 134) - Credits: 16.00

Curriculum: Year 2

Minimum credits: 121

Core modules

Building science 210 (BWT 210) - Credits: 12.00

Building science 220 (BWT 220) - Credits: 8.00

Property law 222 (EOW 222) - Credits: 8.00

Financial management 110 (FBS 110) - Credits: 10.00

Building services 211 (GBD 211) - Credits: 6.00

Building services 221 (GBD 221) - Credits: 6.00

Quantities 200 (HVH 200) - Credits: 24.00

Community-based project 201 (JCP 201) - Credits: 8.00

Civil engineering services 220 (SKE 220) - Credits: 8.00

Statistics 110 (STK 110) - Credits: 13.00

Statistics 161 (STK 161) - Credits: 6.00

Site surveying 213 (TRN 213) - Credits: 12.00

Curriculum: Final year

Minimum credits: 124

Core modules

Business law 310 (BER 310) - Credits: 10.00

Housing 320 (BHU 320) - Credits: 6.00

Quantity surveying practice 300 (BRK 300) - Credits: 18.00

Building science 310 (BWT 310) - Credits: 10.00

Building science 320 (BWT 320) - Credits: 8.00

Financial management 210 (FBS 210) - Credits: 16.00

Financial management 361 (FBS 361) - Credits: 10.00

Building services 311 (GBD 311) - Credits: 6.00

Quantities 300 (HVV 300) - Credits: 24.00

Introduction to construction contract law 322 (KKR 322) - Credits: 8.00

Sustainable construction 320 (VKN 320) - Credits: 8.00

BSc Real Estate (12132024)

Minimum duration of study 3 years

Contact Miss V Wilkens vita.wilkens@up.ac.za +27 (0)124203599

Programme information

Real estate is the study of fixed property and related aspects such as property economics, development, management, valuation, financing, investment and marketing.

Apart from a future in areas such as property investment, property finance and facilities and property management, further studies to obtain an honours degree in real estate can lead to registration as a professional property valuer. Career opportunities encompass the whole spectrum of the property sector, whether as entrepreneurs in the private sector or as employees in the private, government or semi-governmental sectors.

The degree is awarded if all the prescribed modules have been passed.

Admission requirements

- The following persons will be considered for admission: candidates who are in possession of a certificate that is deemed by the University to be equivalent to the required Grade 12 certificate with university endorsement; candidates who are graduates from another tertiary institution or have been granted the status of a graduate of such an institution; and candidates who are graduates of another faculty at the University of Pretoria.
- Life Orientation is excluded when calculating the APS.
- Grade 11 results are used in the conditional admission of prospective students.
- A valid qualification with admission to degree studies is required.
- Minimum subject and achievement requirements, as set out below, are required.
- BSc (Real Estate) is a selection programme.
- Tuition will be presented in English only.

Minimum requirements

Achievement level

English Home

Language or

English First

Additional

Language

NSC/IEB

AS Level

Mathematics

NSC/IEB

AS Level

Physical Science or Accounting

NSC/IEB

AS Level

APS

5

C

5

C

4

D

30

* Cambridge A level candidates who obtained at least a D in the required subjects, will be considered for admission. International Baccalaureate (IB) HL candidates who obtained at least a 4 in the required subjects, will be considered for admission.

Promotion to next study year

Promotion to the second semester of the first year and to the second year of study

- A newly registered first-year student who failed all the prescribed modules for the programme at the end of the first semester shall not be readmitted to the School for the Built Environment in the second semester.
- A student who complies with all the requirements of the first year of study, or has at least obtained 110 credits, is promoted to the second year of study.
- A student who has not obtained at least 70% of the credits of the first year of study after the November examinations must reapply for admission should he/she intend to continue with his/her studies. Written application must be submitted to the student administration of the School for the Built Environment no later than 12 January. Late applications will be accepted only in exceptional circumstances after approval by the Dean and conditions of readmission as determined by the admissions committee shall apply should first-year students be readmitted.
- Students who have not passed all the prescribed modules of the first year of study, as well as students who are readmitted in terms of (c) must register for the outstanding modules of the first year.
- A student who is repeating his/her first year, may, on recommendation of the relevant head of department and with the approval of the Dean, be permitted to enrol for modules of the second year of study in addition to the first-year modules which he or she failed, providing that he or she complies with the prerequisites for the second-year modules and that no timetable clashes occur. The number of credits per semester for which a student registers may not exceed the prescribed number of credits per semester by more than 16 credits.

Promotion to the third year of study

- A student who complies with all the requirements of the second year of study, or has at least obtained 230 credits, is promoted to the third year of study provided that no first year module(s) are outstanding.
- The Dean may, on the recommendation of the Head of Department, allow a student, who qualifies for promotion to a subsequent year of study, but who has not passed all the modules of that year, to carry over those modules to the next or a later year.
- The number of credits per semester for which a student registers may not exceed the prescribed number of credits per semester by more than 16 credits and the prerequisites must be met.
- A student who complies with all the requirements for the degree with the exception of one year module or two semester modules, in which a final mark of at least 40% has been obtained, may be admitted to a special examination in the module(s) concerned, at the start of the ensuing semester.
- On the recommendation of the Head of Department, in exceptional circumstances deviation from the abovementioned stipulations, may be approved by the Faculty Executive Committee, provided that no

timetable clashes occur.

Pass with distinction

The degree is conferred with distinction on a student:

- i. if no module of the second and third study year was repeated and a weighted average of at least 75% was obtained in one year in all the modules (excluding JCP 201), of the final study year;
- ii. the degree programme was completed within the prescribed three study years, and the final study year modules were passed on first registration without any supplementary or special examinations.

Curriculum: Year 1

Minimum credits: 126

Fundamental modules

Academic information management 111 (AIM 111) - Credits: 4.00

Academic information management 121 (AIM 121) - Credits: 4.00

Academic literacy for Construction Economics 122 (ALL 122) - Credits: 6.00

Academic orientation 112 (UPO 112) - Credits: 0.00

Core modules

Building organisation 121 (BGG 121) - Credits: 4.00

Building drawings 111 (BOU 111) - Credits: 4.00

Building science 110 (BWT 110) - Credits: 8.00

Building science 120 (BWT 120) - Credits: 8.00

Economics 110 (EKN 110) - Credits: 10.00

Economics 120 (EKN 120) - Credits: 10.00

Real estate 110 (EWS 110) - Credits: 8.00

Real estate 120 (EWS 120) - Credits: 8.00

Building services 112 (GBD 112) - Credits: 6.00

Building services 122 (GBD 122) - Credits: 6.00

Quantities 101 (HVV 101) - Credits: 24.00

Mathematics 134 (WTW 134) - Credits: 16.00

Curriculum: Year 2

Minimum credits: 121

Core modules

Building science 210 (BWT 210) - Credits: 12.00

Building science 220 (BWT 220) - Credits: 8.00

Property law 222 (EOW 222) - Credits: 8.00

Real estate 210 (EWS 210) - Credits: 12.00

Real estate 220 (EWS 220) - Credits: 12.00

Financial management 110 (FBS 110) - Credits: 10.00

Building services 211 (GBD 211) - Credits: 6.00

Building services 221 (GBD 221) - Credits: 6.00

Community-based project 201 (JCP 201) - Credits: 8.00

Civil engineering services 220 (SKE 220) - Credits: 8.00

Statistics 110 (STK 110) - Credits: 13.00

Statistics 161 (STK 161) - Credits: 6.00
Site surveying 213 (TRN 213) - Credits: 12.00

Curriculum: Final year

Minimum credits: 120

Core modules

Business law 310 (BER 310) - Credits: 10.00
Housing 320 (BHU 320) - Credits: 6.00
Building science 310 (BWT 310) - Credits: 10.00
Building science 320 (BWT 320) - Credits: 8.00
Property valuation 300 (EDW 300) - Credits: 24.00
Real estate 310 (EWS 310) - Credits: 12.00
Real estate 320 (EWS 320) - Credits: 12.00
Financial management 210 (FBS 210) - Credits: 16.00
Building services 311 (GBD 311) - Credits: 6.00
Introduction to construction contract law 322 (KKR 322) - Credits: 8.00
Sustainable construction 320 (VKN 320) - Credits: 8.00

BTRP (12132026)

Minimum duration of study 4 years

Programme information

Town and regional planning is primarily concerned with the planning, design, implementation and management of public interventions in the development and use of land from site to supranational level so as to widen choice, promote equity and ensure sustainable development. The guiding motive of the profession is the generation of viable alternatives to present settlement types. At the current juncture in South Africa's history, town and regional planning is a key profession in the rectification of the spatial and other imbalances in both urban and rural areas, as well as the improvement of inefficient and under-performing living environments.

The ideal town and regional planner is a creative person who is able to put forward innovative solutions to complex problems, a mediator who is able to reconcile diverse points of view, a strategic thinker and a good manager. Given the enormous backlogs in the fields of housing and social services and the misery in which many South Africans find themselves, planners also need a strongly developed sense of social and environmental justice and be committed to human development. While the majority of town and regional planners act as private consultants to the public and the private sector, they are also employed by all three spheres of government, research agencies such as the CSIR and the HSRC, non-governmental organisations, community-based organisations, major financial institutions and property development groups.

Admission requirements

- The following persons will be considered for admission: candidates who are in possession of a certificate that is deemed by the University to be equivalent to the required Grade 12 certificate with university endorsement; candidates who are graduates from another tertiary institution or have been granted the status of a graduate of such an institution; and candidates who are graduates of another faculty at the University of Pretoria.
- Life Orientation is excluded when calculating the APS.
- Grade 11 results are used in the conditional admission of prospective students.

- A valid qualification with admission to degree studies is required.
- Minimum subject and achievement requirements, as set out below, are required.
- BTRP – Bachelor of Town and Regional Planning is a selection programme.
- Tuition will be presented in English only.

Minimum requirements

Achievement level

English Home Language or English First Additional Language

NSC/IEB

AS Level

5

C

Mathematics

NSC/IEB

4

AS Level

D

APS

27

* Cambridge A level candidates who obtained at least a D in the required subjects, will be considered for admission. International Baccalaureate (IB) HL candidates who obtained at least a 4 in the required subjects, will be considered for admission.

Promotion to next study year

i. Promotion to the second semester of the first year and to the second year of study

- A new first-year student who fails all the prescribed modules for the programme at the end of the first semester shall not be readmitted to the School for the Built Environment in the second semester.
- A student is promoted to the second year provided the student (1) has obtained at least 100 credits; and (2) is not repeating more than one first-year Town and Regional planning module per semester; and (3) has obtained a final mark of at least 40 – 49% in the respective town and regional planning module(s) being repeated.
- A student who is not promoted to the second year of study in terms of (b) may not register for second-year Town and Regional planning modules.
- Students who have not obtained at least 100 credits of the first year of study after the November examinations must apply for re-admission should they intend to proceed with their studies. Written application must be submitted to the student administration for the School for the Built Environment no later than 12 January. Late applications will only be accepted under exceptional circumstances and with approval by the Dean. If first year students are readmitted, conditions of readmission will be set by the admissions committee.
- Students who have not passed all the prescribed modules of the first year of study, as well as students who are readmitted in terms of (d) must register for the outstanding modules of the first year.

ii. Promotion to the third year of study

- A student is promoted to the third year provided the student (1) has obtained at least 200 credits; (2) is not repeating any first or second-year Town and regional planning module.
- A student who is not promoted to the third year of study in terms of (a) may not register for third-year Town and regional planning modules.

iii. Promotion to the fourth year of study

-
- a. A student is promoted to the fourth year provided the student (1) has obtained at least 300 credits; and (2) is not repeating any third-year Town and regional planning module.
 - b. A student who is not promoted to the fourth year of study in terms of (a) may not register for fourth-year Town and Regional planning modules.
 - c. A student who complies with all the requirements for the degree with the exception of one year module or two semester modules, in which a final mark of at least 40% has been obtained, may be admitted to a special examination in the module(s) concerned at the start of the ensuing semester.
 - d. The degree is awarded if all the prescribed modules have been passed.

Pass with distinction

The degree is conferred with distinction on a student who, at first registration passes all modules of the final year with a weighted average of 75%. The degree must have been completed within the minimum prescribed time. Exceptional cases will be considered by the Dean.

Curriculum: Year 1

Minimum credits: 162

Fundamental modules

Academic information management 101 (AIM 101) - Credits: 6.00

Academic information management 111 (AIM 111) - Credits: 4.00

Academic information management 121 (AIM 121) - Credits: 4.00

Academic literacy for Town and Regional Planning 123 (ALL 123) - Credits: 6.00

Academic orientation 112 (UPO 112) - Credits: 0.00

Core modules

Economics 110 (EKN 110) - Credits: 10.00

Economics 120 (EKN 120) - Credits: 10.00

Sociology 110 (SOC 110) - Credits: 12.00

Sociology 120 (SOC 120) - Credits: 12.00

Statistics 110 (STK 110) - Credits: 13.00

Statistics 120 (STK 120) - Credits: 13.00

Site analysis and assessment 110 (TPA 110) - Credits: 16.00

Settlement analysis and assessment 120 (TPA 120) - Credits: 16.00

Planning and settlement histories before the Industrial Revolution 110 (TPH 110) - Credits: 12.00

Planning and settlement histories since the Industrial Revolution 120 (TPH 120) - Credits: 12.00

Principles of settlement design 120 (TPS 120) - Credits: 12.00

Introduction to planning 110 (TRP 110) - Credits: 12.00

Curriculum: Year 2

Minimum credits: 132

Core modules

Community-based project 201 (JCP 201) - Credits: 8.00

Plan and policy analysis and assessment 210 (TPA 210) - Credits: 12.00

Introduction to development planning 210 (TPD 210) - Credits: 12.00

Municipal development planning 220 (TPD 220) - Credits: 12.00

Settlement design concepts 210 (TPS 210) - Credits: 16.00

Settlement establishment planning and housing delivery 220 (TPS 220) - Credits: 16.00
Theory and practice of land-use management 211 (TPU 211) - Credits: 12.00
Urban land development economics 221 (TPU 221) - Credits: 12.00

Elective modules

Economics 214 (EKN 214) - Credits: 16.00
Economics 234 (EKN 234) - Credits: 16.00
Sociology 210 (SOC 210) - Credits: 20.00
Sociology 220 (SOC 220) - Credits: 20.00
Sociology 221 (SOC 221) - Credits: 20.00

Curriculum: Year 3

Minimum credits: 120

Core modules

Regional development planning 310 (TPD 310) - Credits: 12.00
Rural development planning 320 (TPD 320) - Credits: 12.00
Spatial concepts 310 (TPS 310) - Credits: 16.00
Transport planning 321 (TPS 321) - Credits: 8.00
Municipal services provision 322 (TPS 322) - Credits: 8.00
Institutional and legal structures for planning 310 (TPW 310) - Credits: 12.00
Planning prospects 320 (TRP 320) - Credits: 12.00

Elective modules

Economics 310 (EKN 310) - Credits: 20.00
Economics 320 (EKN 320) - Credits: 20.00
Sociology 310 (SOC 310) - Credits: 30.00
Sociology 321 (SOC 321) - Credits: 30.00

Curriculum: Final year

Minimum credits: 96

Core modules

Research methodology 410 (TPE 410) - Credits: 12.00
Research report 420 (TPE 420) - Credits: 30.00
Planning interventions: Precinct scale 451 (TPI 451) - Credits: 12.00
Planning interventions: Peri-urban and rural scale 452 (TPI 452) - Credits: 12.00
Planning interventions: Metropolitan scale 453 (TPI 453) - Credits: 12.00
Planning interventions: Supranational, national and provincial scale 454 (TPI 454) - Credits: 12.00
Professional practice 412 (TRP 412) - Credits: 6.00

Honours

BArchHons (12242005)

Minimum duration of study 1 year

Contact	Prof C Combrinck	carin.combrinck@up.ac.za	+27 (0)124206536
	Dr N Botes	nico.botes@up.ac.za	+27 (0)124204600

Admission requirements

- A BScArch degree, or an equivalent university degree, or an applicable tertiary qualification that includes spatial design at NQF level 7 (or NQF level 6 for qualifications obtained before 2009).
- The departmental Postgraduate Committee may require an evaluation in fields of knowledge (including relevant computer skills) and registration for additional modules for non-degree purposes.
- Applicants who completed the BScArch at the University of Pretoria with a minimum of 70% average in the final year of study (including 70% for design in the final year) and completed all third-year modules in the same academic year, will be granted admission after a year of practical experience. A portfolio of visual work must be submitted.
- All other applicants must have practical experience and/or a record of an extended study excursion, and are interviewed for selection.
- A limited number of applicants are admitted to this programme. Refer to the departmental website for guidelines.

Additional requirements

Also refer to G Regulations G.16 to G.29 and G.54.

Other programme-specific information

The degree is awarded to those students who have obtained the prescribed credits. Those students admitted with conditions must comply with all of these before all the 700 series module credits and the degree are awarded.

Examinations and pass requirements

The minimum pass mark is 50%. A minimum of 40% is required in the examination, with a minimum final mark of 50% to pass. If a module is not evaluated by examination a minimum coursework mark of 50% is required. If the module is not evaluated by coursework a minimum examination mark of 50% is required.

Pass with distinction

The degree is conferred with distinction if students registered for the degree for the first time, complete the degree within the minimum prescribed time and pass all modules with a weighted average of 75%.

Curriculum: Final year

Minimum credits: 120

Core modules

Continuing practice development 710 (CPD 710) - Credits: 6.00
Continuing practice development 720 (CPD 720) - Credits: 6.00
Continuing practice development 730 (CPD 730) - Credits: 6.00
Continuing practice development 740 (CPD 740) - Credits: 6.00
Research field project 710 (RFP 710) - Credits: 16.00
Research field project 711 (RFP 711) - Credits: 16.00
Research field project 721 (RFP 721) - Credits: 16.00
Research field project 731 (RFP 731) - Credits: 16.00
Research field studies 710 (RFS 710) - Credits: 32.00

BEngHons Bioengineering (12240203)

Minimum duration of study 1 year

Programme information

The curriculum is determined in consultation with the relevant heads of departments. A student is required to pass modules to the value of at least 128 credits.

The degree is awarded on the basis of examinations only.

Admission requirements

- A BEng degree awarded by the University of Pretoria (or equivalent); or a four-year bachelor's degree in engineering that ECSA regards as acceptable for registration as a candidate engineer and for eventual registration as a professional engineer.
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.

Other programme-specific information

Students may take modules to the value of 32 credits from other fields of specialisation or from other departments, with approval of the Coordinator: Postgraduate studies.

It is a requirement that a student must complete all three the bioengineering honours modules, as well as Introduction to research 732 (EIN 732), to enroll for a master's or a PhD in Bioengineering.

Examinations and pass requirements

- i. The examination in each module for which a student is registered, takes place during the normal examination period after the conclusion of lectures (i.e. October/November or May/June).
- ii. A student registered for the honours degree must complete his or her studies within two years (full-time), or within three years (part-time) after first registration for the degree: Provided that the Dean, on recommendation of the relevant head of department, may approve a stipulated limited extension of this period.
- iii. A student must obtain at least 50% in an examination for each module where no semester or year mark is required. A module may only be repeated once.
- iv. In modules where semester or year marks are awarded, a minimum examination mark of 40% and a final mark of 50% is required.

v. No supplementary or special examinations are granted at postgraduate level.

Pass with distinction

A student passes with distinction if he or she obtains a weighted average of at least 75% in the first 128 credits for which he or she has registered (excluding modules which were discontinued timeously). The degree is not awarded with distinction if a student fails any one module (excluding modules which were discontinued timeously).

Curriculum: Final year

Minimum credits: 128

EIN 732 is a compulsory module. With permission from the department it may be substituted with:

EPT 732 OR

EPT 733

EIN 732 is 'n verpligte module. Met toestemming van die departement mag dit vervang word met:

EPT 732 OF

EPT 733

Core modules

Biosignals and systems 732 (EBB 732) - Credits: 32.00

Bioelectricity and electronics 732 (EBE 732) - Credits: 32.00

Bioelectromagnetism and modelling 732 (EBI 732) - Credits: 32.00

Introduction to research 732 (EIN 732) - Credits: 32.00

BEngHons Chemical Engineering (12240022)

Minimum duration of study 1 year

Programme information

The curriculum is determined in consultation with the relevant heads of departments. A student is required to pass modules to the value of at least 128 credits.

The degree is awarded on the basis of examinations only.

Admission requirements

- A BEng degree awarded by the University of Pretoria; or a four-year bachelor's degree in engineering that the Engineering Council of South-Africa (ECSA) regards as acceptable for registration as a candidate engineer and for eventual registration as a professional engineer.
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and curriculum vitae (CV), and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.

Other programme-specific information

A limited number of appropriate modules from other departments and from other divisions of Chemical Engineering are allowed.

Not all modules listed are presented each year. Please consult the departmental postgraduate brochure.

Examinations and pass requirements

- i. The examination in each module for which a student is registered, takes place during the normal examination period after the conclusion of lectures (i.e. October/November or May/June).
- ii. A student registered for the honours degree must complete his or her studies within two years (full-time), or within three years (part-time) after first registration for the degree: Provided that the Dean, on recommendation of the relevant head of department, may approve a stipulated limited extension of this period.
- iii. A student must obtain at least 50% in an examination for each module where no semester or year mark is required. A module may only be repeated once.
- iv. In modules where semester or year marks are awarded, a minimum examination mark of 40% and a final mark of 50% is required.
- v. No supplementary or special examinations are granted at postgraduate level.

Pass with distinction

A student passes with distinction if he or she obtains a weighted average of at least 75% in the first 128 credits for which he or she has registered (excluding modules which were discontinued timeously). The degree is not awarded with distinction if a student fails any one module (excluding modules which were discontinued timeously).

Curriculum: Final year

Minimum credits: 128

Core modules

Bioprocessing 732 (CBP 732) - Credits: 32.00
Fluoro-materials science research and technology 732 (CFT 732) - Credits: 32.00
Chemical engineering 702 (CIR 702) - Credits: 32.00
Environmental nanomaterials 732 (CKO 732) - Credits: 32.00
Carbon materials science research and technology 732 (CMS 732) - Credits: 32.00
Product design 732 (CPO 732) - Credits: 32.00
Polymer processing 732 (CPP 732) - Credits: 32.00
Polymer materials science and research 732 (CPW 732) - Credits: 32.00
Bio-reaction engineering 732 (CRH 732) - Credits: 32.00
Research orientation 700 (CRO 700) - Credits: 32.00
Separation technology 732 (CSK 732) - Credits: 32.00
Process control system research and development 732 (CSP 732) - Credits: 32.00
Additive technology 732 (CYM 732) - Credits: 32.00
Biological water treatment 780 (WBW 780) - Credits: 32.00

BEngHons Computer Engineering (12240214)

Minimum duration of study 1 year

Programme information

The curriculum is determined in consultation with the relevant heads of departments. A student is required to pass modules to the value of at least 128 credits.

The degree is awarded on the basis of examinations only.

Admission requirements

- A BEng degree awarded by the University of Pretoria (or equivalent); or a four-year bachelor's degree in engineering that ECSA regards as acceptable for registration as a candidate engineer and for eventual registration as a professional engineer.
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.

Other programme-specific information

Students may take modules to the value of 32 credits from other fields of specialisation or from other departments, with approval of the Coordinator: Postgraduate Studies.

Examinations and pass requirements

- i. The examination in each module for which a student is registered, takes place during the normal examination period after the conclusion of lectures (i.e. October/November or May/June).
- ii. A student registered for the honours degree must complete his or her studies within two years (full-time), or within three years (part-time) after first registration for the degree: Provided that the Dean, on recommendation of the relevant head of department, may approve a stipulated limited extension of this period.
- iii. A student must obtain at least 50% in an examination for each module where no semester or year mark is required. A module may only be repeated once.
- iv. In modules where semester or year marks are awarded, a minimum examination mark of 40% and a final mark of 50% is required.
- v. No supplementary or special examinations are granted at postgraduate level.

Pass with distinction

A student passes with distinction if he or she obtains a weighted average of at least 75% in the first 128 credits for which he or she has registered (excluding modules which were discontinued timeously). The degree is not awarded with distinction if a student fails any one module (excluding modules which were discontinued timeously).

Curriculum: Final year

Minimum credits: 128

EIN 732 is a compulsory module. With permission from the department it may be substituted with:

EPT 732 OR

EPT 733

EIN 732 is 'n verpligte module. Met toestemming van die departement mag dit vervang word met:

EPT 732 OF

EPT 733

Core modules

Intelligent systems 732 (EAI 732) - Credits: 32.00
Advanced topics in intelligent systems 733 (EAI 733) - Credits: 32.00
Introduction to research 732 (EIN 732) - Credits: 32.00
Wireless sensor networks 732 (EKS 732) - Credits: 32.00
Research project: Theory 732 (EPT 732) - Credits: 32.00
Research project: Design and laboratory 733 (EPT 733) - Credits: 32.00
Computer networks 780 (ERN 780) - Credits: 32.00
Digital communications 732 (ETD 732) - Credits: 32.00
Telecommunication systems engineering 732 (ETT 732) - Credits: 32.00

BEngHons Control Engineering (12240232)

Minimum duration of study 1 year

Programme information

The curriculum is determined in consultation with the relevant heads of departments. A student is required to pass modules to the value of at least 128 credits.

The degree is awarded on the basis of examinations only.

Admission requirements

- A BEng degree awarded by the University of Pretoria; or a four-year bachelor's degree in engineering that the Engineering Council of South-Africa (ECSA) regards as acceptable for registration as a candidate engineer and for eventual registration as a professional engineer.
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and curriculum vitae (CV), and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.

Other programme-specific information

Not all modules listed are presented each year. Please consult the departmental postgraduate brochure.

Examinations and pass requirements

- i. The examination in each module for which a student is registered, takes place during the normal examination period after the conclusion of lectures (i.e. October/November or May/June).
- ii. A student registered for the honours degree must complete his or her studies within two years (full-time), or within three years (part-time) after first registration for the degree: Provided that the Dean, on recommendation of the relevant head of department, may approve a stipulated limited extension of this period.
- iii. A student must obtain at least 50% in an examination for each module where no semester or year mark is required. A module may only be repeated once.
- iv. In modules where semester or year marks are awarded, a minimum examination mark of 40% and a final mark of 50% is required.
- v. No supplementary or special examinations are granted at postgraduate level.

Pass with distinction

A student passes with distinction if he or she obtains a weighted average of at least 75% in the first 128 credits for which he or she has registered (excluding modules which were discontinued timeously). The degree is not awarded with distinction if a student fails any one module (excluding modules which were discontinued timeously).

Curriculum: Final year

Minimum credits: 128

Core modules

Multivariable control system design 700 (CBO 700) - Credits: 32.00

Multivariable control system theory 700 (CBT 700) - Credits: 32.00

Model-based control laboratory 732 (CML 732) - Credits: 32.00

Process control system research and development 732 (CSP 732) - Credits: 32.00

BEngHons Electrical Engineering (12240032)

Minimum duration of study 1 year

Programme information

The curriculum is determined in consultation with the relevant heads of departments. A student is required to pass modules to the value of at least 128 credits.

The degree is awarded on the basis of examinations only.

Admission requirements

- A BEng degree awarded by the University of Pretoria (or equivalent); or a four-year bachelor's degree in engineering that ECSA regards as acceptable for registration as a candidate engineer and for eventual registration as a professional engineer.
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.

Other programme-specific information

Students may take modules to the value of 32 credits from other fields of specialisation or from other departments, with approval of the Coordinator: Postgraduate Studies.

Examinations and pass requirements

- i. The examination in each module for which a student is registered, takes place during the normal examination period after the conclusion of lectures (i.e. October/November or May/June).
- ii. A student registered for the honours degree must complete his or her studies within two years (full-time), or within three years (part-time) after first registration for the degree: Provided that the Dean, on recommendation of the relevant head of department, may approve a stipulated limited extension of this period.
- iii. A student must obtain at least 50% in an examination for each module where no semester or year mark is required. A module may only be repeated once.

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- iv. In modules where semester or year marks are awarded, a minimum examination mark of 40% and a final mark of 50% is required.
 - v. No supplementary or special examinations are granted at postgraduate level.

Pass with distinction

A student passes with distinction if he or she obtains a weighted average of at least 75% in the first 128 credits for which he or she has registered (excluding modules which were discontinued timeously). The degree is not awarded with distinction if a student fails any one module (excluding modules which were discontinued timeously).

Curriculum: Final year

Minimum credits: 128

EIN 732 is a compulsory module. With permission from the department it may be substituted with:

EPT 732 OR

EPT 733

EIN 732 is 'n verpligte module. Met toestemming van die departement mag dit vervang word met:

EPT 732 OF

EPT 733

Core modules

[Optimal control 780](#) (EBO 780) - Credits: 32.00

[Power electronics 780](#) (EED 780) - Credits: 32.00

[Energy management 732](#) (EES 732) - Credits: 32.00

[Power distribution engineering 732](#) (EEV 732) - Credits: 32.00

[Renewable energy 732](#) (EGH 732) - Credits: 32.00

[Introduction to research 732](#) (EIN 732) - Credits: 32.00

[Multivariable control systems 732](#) (EMB 732) - Credits: 32.00

[Energy optimisation 732](#) (ENO 732) - Credits: 32.00

[Research project: Theory 732](#) (EPT 732) - Credits: 32.00

[Research project: Design and laboratory 733](#) (EPT 733) - Credits: 32.00

BEngHons Electronic Engineering (12240092)

Minimum duration of study 1 year

Programme information

The curriculum is determined in consultation with the relevant heads of departments. A student is required to pass modules to the value of at least 128 credits.

The degree is awarded on the basis of examinations only.

Admission requirements

- A BEng degree awarded by the University of Pretoria (or equivalent); or a four-year bachelor's degree in engineering that ECSA regards as acceptable for registration as a candidate engineer and for eventual

registration as a professional engineer.

- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.

Other programme-specific information

Students may take modules to the value of 32 credits from other fields of specialisation or from other departments, with approval of the Coordinator: Postgraduate Studies.

Examinations and pass requirements

- i. The examination in each module for which a student is registered, takes place during the normal examination period after the conclusion of lectures (i.e. October/November or May/June).
- ii. A student registered for the honours degree must complete his or her studies within two years (full-time), or within three years (part-time) after first registration for the degree: Provided that the Dean, on recommendation of the relevant head of department, may approve a stipulated limited extension of this period.
- iii. A student must obtain at least 50% in an examination for each module where no semester or year mark is required. A module may only be repeated once.
- iv. In modules where semester or year marks are awarded, a minimum examination mark of 40% and a final mark of 50% is required.
- v. No supplementary or special examinations are granted at postgraduate level.

Pass with distinction

A student passes with distinction if he or she obtains a weighted average of at least 75% in the first 128 credits for which he or she has registered (excluding modules which were discontinued timeously). The degree is not awarded with distinction if a student fails any one module (excluding modules which were discontinued timeously).

Curriculum: Final year

Minimum credits: 128

EIN 732 is a compulsory module. With permission from the department it may be substituted with:

EPT 732 OR

EPT 733

EIN 732 is 'n verpligte module. Met toestemming van die departement mag dit vervang word met:

EPT 732 OF

EPT 733

Core modules

Intelligent systems 732 (EAI 732) - Credits: 32.00

Advanced topics in intelligent systems 733 (EAI 733) - Credits: 32.00

Biosignals and systems 732 (EBB 732) - Credits: 32.00

Bioelectricity and electronics 732 (EBE 732) - Credits: 32.00

Bioelectromagnetism and modelling 732 (EBI 732) - Credits: 32.00

Optimal control 780 (EBO 780) - Credits: 32.00
Energy management 732 (EES 732) - Credits: 32.00
Introduction to research 732 (EIN 732) - Credits: 32.00
Wireless sensor networks 732 (EKS 732) - Credits: 32.00
Electronic defence - electronic countermeasures 780 (ELB 780) - Credits: 32.00
Electronic defence - electronic support 781 (ELB 781) - Credits: 32.00
Antenna theory 780 (EMA 780) - Credits: 32.00
Multivariable control systems 732 (EMB 732) - Credits: 32.00
Analogue electronic design 732 (EME 732) - Credits: 32.00
Communication electronics 732 (EMK 732) - Credits: 32.00
Microwave theory 780 (EMM 780) - Credits: 32.00
Energy optimisation 732 (ENO 732) - Credits: 32.00
Research project: Theory 732 (EPT 732) - Credits: 32.00
Research project: Design and laboratory 733 (EPT 733) - Credits: 32.00
Computer networks 780 (ERN 780) - Credits: 32.00
Digital communications 732 (ETD 732) - Credits: 32.00
Telecommunication systems engineering 732 (ETT 732) - Credits: 32.00

BEngHons Engineering and Technology Management (12240252)

Minimum duration of study 1 year

Programme information

The BEngHons (Engineering and Technology Management) degree is conferred by the following academic department: Engineering and Technology Management.

The stipulations of Faculty Regulations for honours degrees apply mutatis mutandis.

Any specific module is offered on the condition that a minimum number of students are registered for the module, as determined by the head of department and the Dean. Students must consult the relevant head of department in order to compile a meaningful programme, as well as on the syllabi of the modules. The relevant departmental postgraduate brochures must be consulted.

The curriculum is determined in consultation with the relevant heads of departments. A student is required to pass modules to the value of at least 128 credits.

The degree is awarded on the basis of examinations only.

Admission requirements

- An appropriate South African BEng degree.
- An applicant from outside South Africa must have an accredited Washington Accord BEng degree.
- A full first year of Mathematics or an equivalent is required.
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and to decide if the applicant may be admitted.

Examinations and pass requirements

- i. The examination in each module for which a student is registered, takes place during the normal examination period after the conclusion of lectures (i.e. October/November or May/June).

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- ii. A student registered for the honours degree must complete his or her studies within two years (full-time), or within three years (part-time) after first registration for the degree: Provided that the Dean, on recommendation of the relevant head of department, may approve a stipulated limited extension of this period.
 - iii. A student must obtain at least 50% in an examination for each module where no semester or year mark is required. A module may only be repeated once.
 - iv. In modules where semester or year marks are awarded, a minimum examination mark of 40% and a final mark of 50% is required.
 - v. No supplementary or special examinations are granted at postgraduate level.

Pass with distinction

A student passes with distinction if he or she obtains a weighted average of at least 75% in the first 128 credits for which he or she has registered (excluding modules which were discontinued timeously). The degree is not awarded with distinction if a student fails any one module (excluding modules which were discontinued timeously). The degree must be completed within the prescribed study period.

Curriculum: Final year

Minimum credits: 128

Core modules

Research project 780 (IGB 780) - Credits: 32.00
Engineering technology economics 780 (IKN 780) - Credits: 16.00
Technology and innovation management 780 (INV 780) - Credits: 16.00
Project management 780 (IPK 780) - Credits: 16.00
Systems thinking and engineering 780 (ISE 780) - Credits: 16.00

Elective modules

Technological entrepreneurship 780 (IEE 780) - Credits: 16.00
Maintenance and asset management 780 (IMC 780) - Credits: 16.00
Operations management 781 (IVV 781) - Credits: 16.00

BEngHons Environmental Engineering (12240222)

Minimum duration of study 1 year

Programme information

The curriculum is determined in consultation with the relevant heads of departments. A student is required to pass modules to the value of at least 128 credits.

The degree is awarded on the basis of examinations only.

Admission requirements

- A BEng degree awarded by the University of Pretoria; or a four-year bachelor's degree in engineering that the Engineering Council of South-Africa (ECSA) regards as acceptable for registration as a candidate engineer and for eventual registration as a professional engineer.
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and curriculum vitae (CV), and to decide if the applicant is suitable for

postgraduate studies. This assessment may include an oral or written entrance examination.

Other programme-specific information

Not all modules listed are presented each year. Please consult the departmental postgraduate brochure.

Examinations and pass requirements

- i. The examination in each module for which a student is registered, takes place during the normal examination period after the conclusion of lectures (i.e. October/November or May/June).
- ii. A student registered for the honours degree must complete his or her studies within two years (full-time), or within three years (part-time) after first registration for the degree: Provided that the Dean, on recommendation of the relevant head of department, may approve a stipulated limited extension of this period.
- iii. A student must obtain at least 50% in an examination for each module where no semester or year mark is required. A module may only be repeated once.
- iv. In modules where semester or year marks are awarded, a minimum examination mark of 40% and a final mark of 50% is required.
- v. No supplementary or special examinations are granted at postgraduate level.

Pass with distinction

A student passes with distinction if he or she obtains a weighted average of at least 75% in the first 128 credits for which he or she has registered (excluding modules which were discontinued timeously). The degree is not awarded with distinction if a student fails any one module (excluding modules which were discontinued timeously).

Curriculum: Final year

Minimum credits: 128

Core modules

[Air quality control 780](#) (CAM 780) - Credits: 32.00

[Principles of environmental engineering 780](#) (CEM 780) - Credits: 32.00

[Industrial waste engineering 780](#) (WAI 780) - Credits: 32.00

[Water quality management and research 780](#) (WQB 780) - Credits: 32.00

BEngHons Geotechnical Engineering (12240215)

Minimum duration of study 1 year

Programme information

The curriculum is determined in consultation with the relevant heads of departments. A student is required to pass modules to the value of at least 128 credits.

The degree is awarded on the basis of examinations only.

Admission requirements

- A BEng degree awarded by the University of Pretoria; or a four-year bachelor's degree in engineering that ECSA regards as acceptable for registration as a candidate engineer and for eventual registration as a professional

engineer.

- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.

Examinations and pass requirements

- i. The examination in each module for which a student is registered, takes place during the normal examination period after the conclusion of lectures (i.e. October/November or May/June).
- ii. A student registered for the honours degree must complete his or her studies within two years (full-time), or within three years (part-time) after first registration for the degree: Provided that the Dean, on recommendation of the relevant head of department, may approve a stipulated limited extension of this period.
- iii. A student must obtain at least 50% in an examination for each module where no semester or year mark is required. A module may only be repeated once.
- iv. In modules where semester or year marks are awarded, a minimum examination mark of 40% and a final mark of 50% is required.
- v. No supplementary or special examinations are granted at postgraduate level.

Pass with distinction

A student passes with distinction if he or she obtains a weighted average of at least 75% in the first 128 credits for which he or she has registered (excluding modules which were discontinued timeously). The degree is not awarded with distinction if a student fails any one module (excluding modules which were discontinued timeously).

Curriculum: Final year

Minimum credits: 128

Core modules

[Analytical soil mechanics 787](#) (SGS 787) - Credits: 24.00

[Theoretical soil mechanics 788](#) (SGS 788) - Credits: 24.00

[Specialised geotechnical testing 789](#) (SGS 789) - Credits: 24.00

[Civil research 780](#) (SSC 780) - Credits: 32.00

Elective modules

[Applied statistical methods and optimisation 798](#) (SHC 798) - Credits: 24.00

[Numerical methods and finite element applications for Civil Engineers 790](#) (SIK 790) - Credits: 24.00

BEngHons Industrial Engineering (12240012)

Minimum duration of study 1 year

Programme information

The curriculum is determined in consultation with the relevant heads of departments. A student is required to pass modules to the value of at least 128 credits.

The degree is awarded on the basis of examinations only.

Admission requirements

- A BEng degree awarded by the University of Pretoria; or a four-year bachelor's degree in engineering that ECSA regards as acceptable for registration as a candidate engineer and for eventual registration as a professional engineer.
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.

Other programme-specific information

The Programme consists of one compulsory module (32 credits) with any relevant core module as pre-requisite and the remainder of credits either core and/or elective modules. Students are allowed 32 relevant credits from outside the department. Students are advised to select modules in line with their desired research stream:

- Resource Optimisation (RO)
- Business Process Optimisation (BPO)
- Supply Chain Engineering (SCE)

Please refer to the Programme Guide for further information, available [here](#).

Examinations and pass requirements

- i. The examination in each module for which a student is registered, takes place during the normal examination period after the conclusion of lectures (i.e. October/November or May/June).
- ii. A student registered for the honours degree must complete his or her studies within two years (full-time), or within three years (part-time) after first registration for the degree: Provided that the Dean, on recommendation of the relevant head of department, may approve a stipulated limited extension of this period.
- iii. A student must obtain at least 50% in an examination for each module where no semester or year mark is required. A module may only be repeated once.
- iv. In modules where semester or year marks are awarded, a minimum examination mark of 40% and a final mark of 50% is required.
- v. No supplementary or special examinations are granted at postgraduate level.

Pass with distinction

A student passes with distinction if he or she obtains a weighted average of at least 75% in the first 128 credits for which he or she has registered (excluding modules which were discontinued timeously). The degree is not awarded with distinction if a student fails any one module (excluding modules which were discontinued timeously). The degree must be completed within the prescribed study period.

Curriculum: Final year

Minimum credits: 128

BCS 780 is a compulsory module.

Core modules

[Enterprise engineering and research methods 781](#) (BBA 781) - Credits: 32.00

Industrial and systems engineering research 780 (BCS 780) - Credits: 32.00

Supply chain processes 781 (BLK 781) - Credits: 16.00

Operations research 780 (BOZ 780) - Credits: 32.00

Manufacturing planning systems 782 (BPZ 782) - Credits: 32.00

Simulation modelling 780 (BUY 780) - Credits: 32.00

Supply chain design 780 (BVK 780) - Credits: 16.00

Elective modules

Reliability engineering 780 (BTH 780) - Credits: 16.00

BEngHons Mechanical Engineering (12240052)

Minimum duration of study 1 year

Programme information

Also consult the General Regulations G.16 to G.29.

The curriculum is determined in consultation with the relevant heads of departments. A student is required to pass modules to the value of at least 128 credits.

The degree is awarded on the basis of examinations only.

Admission requirements

- BEng degree awarded by the University of Pretoria; or a four-year bachelor's degree in engineering that ECSA regards as acceptable for registration as a candidate engineer and for eventual registration as a professional engineer.
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.

Other programme-specific information

All students must complete the module MSS 732 Research study 732.

A limited number of appropriate modules from other departments are allowed. Not all modules listed are presented each year. Please consult the postgraduate brochure found on the [departmental website](#) for further information.

Examinations and pass requirements

- i. The examination in each module for which a student is registered, takes place during the normal examination period after the conclusion of lectures (i.e. October/November or May/June).
- ii. A student registered for the honours degree must complete his or her studies within two years (full-time), or within three years (part-time) after first registration for the degree: Provided that the Dean, on recommendation of the relevant head of department, may approve a stipulated limited extension of this period.
- iii. A student must obtain at least 50% in an examination for each module where no semester or year mark is required. A module may only be repeated once.
- iv. In modules where semester or year marks are awarded, a minimum examination mark of 40% and a final mark of 50% is required.

v. No supplementary or special examinations are granted at postgraduate level.

Pass with distinction

A student passes with distinction if he or she obtains a weighted average of at least 75% in the first 128 credits for which he or she has registered (excluding modules which were discontinued timeously). The degree is not awarded with distinction if a student fails any one module (excluding modules which were discontinued timeously). The degree must be completed within the prescribed study period.

Curriculum: Final year

Minimum credits: 128

MSS 732 is a compulsory module and should be selected by all students as a core module.

When selecting your elective modules, please consult the Departmental Brochure.

Elective modules

Control Systems 780 (MBB 780) - Credits: 16.00
Non-destructive testing 780 (MCT 780) - Credits: 16.00
Advanced finite element methods 781 (MEE 781) - Credits: 16.00
Mechatronics 780 (MEG 780) - Credits: 16.00
Vibration-based condition monitoring 781 (MEV 781) - Credits: 16.00
Advanced heat and mass transfer 780 (MHM 780) - Credits: 16.00
Condition-based maintenance 780 (MIC 780) - Credits: 16.00
Maintenance practice 780 (MIP 780) - Credits: 16.00
Maintenance logistics 782 (MIP 782) - Credits: 16.00
Reliability engineering 781 (MIR 781) - Credits: 16.00
Aerodynamics 780 (MLD 780) - Credits: 16.00
Unmanned aircraft systems technology 783 (MLD 783) - Credits: 16.00
Avionics 784 (MLD 784) - Credits: 16.00
Air conditioning and refrigeration 780 (MLR 780) - Credits: 16.00
Flight mechanics 780 (MLV 780) - Credits: 16.00
Optimum design 780 (MOO 780) - Credits: 16.00
Fracture mechanics 780 (MSF 780) - Credits: 16.00
Numerical thermoflow 780 (MSM 780) - Credits: 16.00
Numerical thermoflow 781 (MSM 781) - Credits: 16.00
Research study 732 (MSS 732) - Credits: 32.00
Fatigue 780 (MSV 780) - Credits: 16.00
Fluid mechanics 780 (MSX 780) - Credits: 16.00
Advanced thermodynamics and energy systems 781 (MTX 781) - Credits: 16.00
Reactor coolant flow and heat transfer 782 (MUA 782) - Credits: 16.00
Reactor engineering science 783 (MUA 783) - Credits: 16.00
Reactor physics 784 (MUA 784) - Credits: 16.00
Reactor materials engineering 785 (MUA 785) - Credits: 16.00
Reactor materials engineering 786 (MUA 786) - Credits: 16.00
Fossil fuel power stations 781 (MUU 781) - Credits: 16.00
Vehicle dynamics 780 (MVI 780) - Credits: 16.00
Numerical methods 780 (MWN 780) - Credits: 16.00

BEngHons Metallurgical Engineering Welding Engineering (12240064)

Minimum duration of study 1 year

Programme information

The BScHons (Applied Science) degree is conferred by the following academic departments:

- Chemical Engineering
- Civil Engineering
- Industrial and Systems Engineering
- Materials Science and Metallurgical Engineering
- Mechanical and Aeronautical Engineering
- Mining Engineering

Any specific module is offered on the condition that a minimum number of students are registered for the module, as determined by the relevant head of department and the Dean. Students must consult the relevant head of department in order to compile a meaningful programme, as well as on the syllabi of the modules. The relevant departmental postgraduate brochures must also be consulted.

Admission requirements

- BEng degree awarded by the University of Pretoria; or a four-year bachelor's degree in engineering that ECSA regards as acceptable for registration as a candidate engineer and for eventual registration as a professional engineer.
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.

Curriculum: Final year

Minimum credits: 150

Core modules

[Fabrication engineering 700](#) (NFE 700) - Credits: 30.00

[Research project 700](#) (NLO 700) - Credits: 30.00

[Welding metallurgy 700](#) (NSW 700) - Credits: 30.00

[Welding processes 700](#) (NWP 700) - Credits: 30.00

[Design of welded structures 701](#) (NWP 701) - Credits: 30.00

BEngHons Metallurgical Engineering (12240063)

Minimum duration of study 1 year

Programme information

The curriculum is determined in consultation with the relevant heads of departments. A student is required to pass modules to the value of at least 128 credits.

The degree is awarded on the basis of examinations only.

Admission requirements

- BEng degree awarded by the University of Pretoria; or a four-year bachelor's degree in engineering that ECSA regards as acceptable for registration as a candidate engineer and for eventual registration as a professional engineer.
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.

Other programme-specific information

A limited number of appropriate modules from other departments are allowed.

Examinations and pass requirements

- i. The examination in each module for which a student is registered, takes place during the normal examination period after the conclusion of lectures (i.e. October/November or May/June).
- ii. A student registered for the honours degree must complete his or her studies within two years (full-time), or within three years (part-time) after first registration for the degree: Provided that the Dean, on recommendation of the relevant head of department, may approve a stipulated limited extension of this period.
- iii. A student must obtain at least 50% in an examination for each module where no semester or year mark is required. A module may only be repeated once.
- iv. In modules where semester or year marks are awarded, a minimum examination mark of 40% and a final mark of 50% is required.
- v. No supplementary or special examinations are granted at postgraduate level.

Pass with distinction

A student passes with distinction if he or she obtains a weighted average of at least 75% in the first 128 credits for which he or she has registered (excluding modules which were discontinued timeously). The degree is not awarded with distinction if a student fails any one module (excluding modules which were discontinued timeously).

Curriculum: Final year

Minimum credits: 120

NLO 700 is a compulsory module

Core modules

Electrometallurgy 700 (NEL 700) - Credits: 30.00
Fabrication engineering 700 (NFE 700) - Credits: 30.00
Physical metallurgy 700 (NFM 700) - Credits: 30.00
Heat treatment 700 (NHB 700) - Credits: 30.00
Hydrometallurgy 700 (NHM 700) - Credits: 30.00
Corrosion 700 (NKR 700) - Credits: 30.00
Research project 700 (NLO 700) - Credits: 30.00
Mechanical metallurgy 700 (NMM 700) - Credits: 30.00
Minerals processing 700 (NMP 700) - Credits: 30.00

Applied theory of sampling for minerals processing 701 (NMP 701) - Credits: 30.00

Metallurgical analysis 700 (NPA 700) - Credits: 16.00

Pyrometallurgy 700 (NPM 700) - Credits: 30.00

Welding metallurgy 700 (NSW 700) - Credits: 30.00

Refractory materials 700 (NVM 700) - Credits: 30.00

Welding processes 700 (NWP 700) - Credits: 30.00

Design of welded structures 701 (NWP 701) - Credits: 30.00

BEngHons Microelectronic Engineering (12240192)

Minimum duration of study 1 year

Programme information

The curriculum is determined in consultation with the relevant heads of departments. A student is required to pass modules to the value of at least 128 credits.

The degree is awarded on the basis of examinations only.

Admission requirements

- A BEng degree awarded by the University of Pretoria (or equivalent); or a four-year bachelor's degree in engineering that ECSA regards as acceptable for registration as a candidate engineer and for eventual registration as a professional engineer.
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.

Other programme-specific information

Students may take modules to the value of 32 credits from other fields of specialisation or from other departments, with approval of the Coordinator: Postgraduate Studies.

Examinations and pass requirements

- i. The examination in each module for which a student is registered, takes place during the normal examination period after the conclusion of lectures (i.e. October/November or May/June).
- ii. A student registered for the honours degree must complete his or her studies within two years (full-time), or within three years (part-time) after first registration for the degree: Provided that the Dean, on recommendation of the relevant head of department, may approve a stipulated limited extension of this period.
- iii. A student must obtain at least 50% in an examination for each module where no semester or year mark is required. A module may only be repeated once.
- iv. In modules where semester or year marks are awarded, a minimum examination mark of 40% and a final mark of 50% is required.
- v. No supplementary or special examinations are granted at postgraduate level.

Pass with distinction

A student passes with distinction if he or she obtains a weighted average of at least 75% in the first 128 credits for which he or she has registered (excluding modules which were discontinued timeously). The degree is not

awarded with distinction if a student fails any one module (excluding modules which were discontinued timeously).

Curriculum: Final year

Minimum credits: 128

EIN 732 is a compulsory module. With permission from the department it may be substituted with:

EPT 732 OR

EPT 733

EIN 732 is 'n verpligte module. Met toestemming van die departement mag dit vervang word met:

EPT 732 OF

EPT 733

Core modules

Introduction to research 732 (EIN 732) - Credits: 32.00

Analogue electronic design 732 (EME 732) - Credits: 32.00

Communication electronics 732 (EMK 732) - Credits: 32.00

Research project: Theory 732 (EPT 732) - Credits: 32.00

Research project: Design and laboratory 733 (EPT 733) - Credits: 32.00

BEngHons Mining Engineering (12240072)

Minimum duration of study 1 year

Programme information

The curriculum is determined in consultation with the relevant heads of departments. A student is required to pass modules to the value of at least 128 credits.

The degree is awarded on the basis of examinations only.

Admission requirements

- BEng degree awarded by the University of Pretoria; or a four-year bachelor's degree in engineering that ECSA regards as acceptable for registration as a candidate engineer and for eventual registration as a professional engineer.
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.

Other programme-specific information

A limited number of appropriate modules from other departments are allowed, i.e. 64 credits.

Examinations and pass requirements

- i. The examination in each module for which a student is registered, takes place during the normal examination period after the conclusion of lectures (i.e. October/November or May/June).

- ii. A student registered for the honours degree must complete his or her studies within two years (full-time), or within three years (part-time) after first registration for the degree: Provided that the Dean, on recommendation of the relevant head of department, may approve a stipulated limited extension of this period.
- iii. A student must obtain at least 50% in an examination for each module where no semester or year mark is required. A module may only be repeated once.
- iv. In modules where semester or year marks are awarded, a minimum examination mark of 40% and a final mark of 50% is required.
- v. No supplementary or special examinations are granted at postgraduate level.

Pass with distinction

A student passes with distinction if he or she obtains a weighted average of at least 75% in the first 128 credits for which he or she has registered (excluding modules which were discontinued timeously). The degree is not awarded with distinction if a student fails any one module (excluding modules which were discontinued timeously).

Curriculum: Final year

Minimum credits: 128

PSS 700 compulsory module / verpligte module

Core modules

Financial mine valuation 780 (PFZ 780) - Credits: 16.00

Airflow and fans 711 (PKB 711) - Credits: 16.00

Heat and refrigeration 712 (PKB 712) - Credits: 16.00

Advanced design: Mining 780 (PMZ 780) - Credits: 16.00

Open-pit mining 783 (POY 783) - Credits: 16.00

Advanced explosive engineering 785 (PRX 785) - Credits: 16.00

Research project 700 (PSS 700) - Credits: 32.00

Strata control: Hard-rock mining 786 (PSZ 786) - Credits: 16.00

BEngHons Structural Engineering (12240122)

Minimum duration of study 1 year

Programme information

The curriculum is determined in consultation with the relevant heads of departments. A student is required to pass modules to the value of at least 128 credits.

The degree is awarded on the basis of examinations only.

Admission requirements

- A BEng degree awarded by the University of Pretoria; or a four-year bachelor's degree in engineering that ECSA regards as acceptable for registration as a candidate engineer and for eventual registration as a professional engineer.
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This

assessment may include an oral or written entrance examination.

Examinations and pass requirements

- i. The examination in each module for which a student is registered, takes place during the normal examination period after the conclusion of lectures (i.e. October/November or May/June).
- ii. A student registered for the honours degree must complete his or her studies within two years (full-time), or within three years (part-time) after first registration for the degree: Provided that the Dean, on recommendation of the relevant head of department, may approve a stipulated limited extension of this period.
- iii. A student must obtain at least 50% in an examination for each module where no semester or year mark is required. A module may only be repeated once.
- iv. In modules where semester or year marks are awarded, a minimum examination mark of 40% and a final mark of 50% is required.
- v. No supplementary or special examinations are granted at postgraduate level.

Pass with distinction

A student passes with distinction if he or she obtains a weighted average of at least 75% in the first 128 credits for which he or she has registered (excluding modules which were discontinued timeously). The degree is not awarded with distinction if a student fails any one module (excluding modules which were discontinued timeously).

Curriculum: Final year

Minimum credits: 128

Core modules

Numerical methods and finite element applications for Civil Engineers 790 (SIK 790) - Credits: 24.00

Civil research 780 (SSC 780) - Credits: 32.00

Elective modules

Concrete technology 794 (SGC 794) - Credits: 24.00

Structural mechanics 777 (SIN 777) - Credits: 24.00

Pre-stressed concrete design 791 (SIN 791) - Credits: 24.00

Infrastructure management 790 (SSI 790) - Credits: 24.00

BEngHons Transportation Engineering (12240112)

Minimum duration of study 1 year

Programme information

The curriculum is determined in consultation with the relevant heads of departments. A student is required to pass modules to the value of at least 128 credits.

The degree is awarded on the basis of examinations only.

Admission requirements

- A BEng degree awarded by the University of Pretoria; or a four-year bachelor's degree in engineering that ECSA

regards as acceptable for registration as a candidate engineer and for eventual registration as a professional engineer.

- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.

Examinations and pass requirements

- i. The examination in each module for which a student is registered, takes place during the normal examination period after the conclusion of lectures (i.e. October/November or May/June).
- ii. A student registered for the honours degree must complete his or her studies within two years (full-time), or within three years (part-time) after first registration for the degree: Provided that the Dean, on recommendation of the relevant head of department, may approve a stipulated limited extension of this period.
- iii. A student must obtain at least 50% in an examination for each module where no semester or year mark is required. A module may only be repeated once.
- iv. In modules where semester or year marks are awarded, a minimum examination mark of 40% and a final mark of 50% is required.
- v. No supplementary or special examinations are granted at postgraduate level.

Pass with distinction

A student passes with distinction if he or she obtains a weighted average of at least 75% in the first 128 credits for which he or she has registered (excluding modules which were discontinued timeously). The degree is not awarded with distinction if a student fails any one module (excluding modules which were discontinued timeously).

Curriculum: Final year

Minimum credits: 128

SSC 780 compulsory module / verpligte module

Core modules

[Applied statistical methods and optimisation 798](#) (SHC 798) - Credits: 24.00

[Civil research 780](#) (SSC 780) - Credits: 32.00

Elective modules

[Pavement design 793](#) (SGC 793) - Credits: 24.00

[Concrete technology 794](#) (SGC 794) - Credits: 24.00

[Road rehabilitation technology 797](#) (SGC 797) - Credits: 24.00

[Numerical methods and finite element applications for Civil Engineers 790](#) (SIK 790) - Credits: 24.00

[Infrastructure management 790](#) (SSI 790) - Credits: 24.00

[Transportation studies 790](#) (SVC 790) - Credits: 24.00

[Transportation special 791](#) (SVC 791) - Credits: 24.00

[Traffic engineering 792](#) (SVC 792) - Credits: 24.00

BEngHons Water Resources Engineering (12240162)

Minimum duration of study 1 year

Programme information

The curriculum is determined in consultation with the relevant heads of departments. A student is required to pass modules to the value of at least 128 credits.

The degree is awarded on the basis of examinations only.

Admission requirements

- A BEng degree awarded by the University of Pretoria; or a four-year bachelor's degree in engineering that ECSA regards as acceptable for registration as a candidate engineer and for eventual registration as a professional engineer.
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.

Examinations and pass requirements

- i. The examination in each module for which a student is registered, takes place during the normal examination period after the conclusion of lectures (i.e. October/November or May/June).
- ii. A student registered for the honours degree must complete his or her studies within two years (full-time), or within three years (part-time) after first registration for the degree: Provided that the Dean, on recommendation of the relevant head of department, may approve a stipulated limited extension of this period.
- iii. A student must obtain at least 50% in an examination for each module where no semester or year mark is required. A module may only be repeated once.
- iv. In modules where semester or year marks are awarded, a minimum examination mark of 40% and a final mark of 50% is required.
- v. No supplementary or special examinations are granted at postgraduate level.

Pass with distinction

A student passes with distinction if he or she obtains a weighted average of at least 75% in the first 128 credits for which he or she has registered (excluding modules which were discontinued timeously). The degree is not awarded with distinction if a student fails any one module (excluding modules which were discontinued timeously).

Curriculum: Final year

Minimum credits: 128

SSC 780 compulsory module / verpligte module

Core modules

Civil research 780 (SSC 780) - Credits: 32.00

Elective modules

Concrete technology 794 (SGC 794) - Credits: 24.00

Flood hydrology 792 (SHC 792) - Credits: 24.00

Pipe flow 795 (SHC 795) - Credits: 24.00

Applied statistical methods and optimisation 798 (SHC 798) - Credits: 24.00

Numerical methods and finite element applications for Civil Engineers 790 (SIK 790) - Credits: 24.00

Infrastructure management 790 (SSI 790) - Credits: 24.00

BEngHons Water Utilisation Engineering (12240103)

Minimum duration of study 1 year

Programme information

The curriculum is determined in consultation with the relevant heads of departments. A student is required to pass modules to the value of at least 128 credits.

The degree is awarded on the basis of examinations only.

Admission requirements

- A BEng degree awarded by the University of Pretoria; or a four-year bachelor's degree in engineering that the Engineering Council of South-Africa (ECSA) regards as acceptable for registration as a candidate engineer and for eventual registration as a professional engineer.
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and curriculum vitae (CV), and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination

Other programme-specific information

A limited number of appropriate modules from other departments and from other divisions of Chemical Engineering are allowed.

Not all modules listed are presented each year. Please consult the departmental postgraduate brochure.

Examinations and pass requirements

- i. The examination in each module for which a student is registered, takes place during the normal examination period after the conclusion of lectures (i.e. October/November or May/June).
- ii. A student registered for the honours degree must complete his or her studies within two years (full-time), or within three years (part-time) after first registration for the degree: Provided that the Dean, on recommendation of the relevant head of department, may approve a stipulated limited extension of this period.
- iii. A student must obtain at least 50% in an examination for each module where no semester or year mark is required. A module may only be repeated once.
- iv. In modules where semester or year marks are awarded, a minimum examination mark of 40% and a final mark of 50% is required.
- v. No supplementary or special examinations are granted at postgraduate level.

Pass with distinction

A student passes with distinction if he or she obtains a weighted average of at least 75% in the first 128 credits for which he or she has registered (excluding modules which were discontinued timeously). The degree is not awarded with distinction if a student fails any one module (excluding modules which were discontinued timeously).

Curriculum: Final year

Minimum credits: 128

Core modules

Principles of environmental engineering 780 (CEM 780) - Credits: 32.00

Industrial waste engineering 780 (WAI 780) - Credits: 32.00

Biological water treatment 780 (WBW 780) - Credits: 32.00

Chemical water treatment 780 (WCW 780) - Credits: 32.00

Water quality management and research 780 (WQB 780) - Credits: 32.00

BIntArchHons (12242007)

Minimum duration of study 1 year

Contact	Prof C Combrinck	carin.combrinck@up.ac.za	+27 (0)124206536
	Dr N Botes	nico.botes@up.ac.za	+27 (0)124204600

Admission requirements

1. BSc (Interior Architecture) (or equivalent) degree **or** relevant tertiary qualification that includes spatial design at NQF level 7 (or NQF level 6 for qualifications obtained before 2009)
2. At least one year of practical experience and/or a record of an extended study excursion

Other programme-specific information

Refer to G Regulations G.16 to G.29 and G.54.

The degree is awarded to those students who have obtained the prescribed credits. Those students admitted with conditions must comply with all of these before all the 700 series module credits and the degree are awarded.

Examinations and pass requirements

The minimum pass mark is 50%. A minimum of 40% is required in the examination, with a minimum final mark of 50% to pass. If a module is not evaluated by examination a minimum coursework mark of 50% is required. If the module is not evaluated by coursework, a minimum examination mark of 50% is required.

Pass with distinction

The degree is conferred with distinction if students registered for the degree for the first time, complete the degree within the minimum prescribed time and pass all modules with a weighted average of 75%.

Curriculum: Final year

Minimum credits: 120

Core modules

Continuing practice development 710 (CPD 710) - Credits: 6.00

Continuing practice development 720 (CPD 720) - Credits: 6.00
Continuing practice development 730 (CPD 730) - Credits: 6.00
Continuing practice development 740 (CPD 740) - Credits: 6.00
Research field project 713 (RFP 713) - Credits: 16.00
Research field project 723 (RFP 723) - Credits: 16.00
Research field project 730 (RFP 730) - Credits: 16.00
Research field project 733 (RFP 733) - Credits: 16.00
Research field studies 730 (RFS 730) - Credits: 32.00

BISHons Information Science (12240006)

Minimum duration of study 1 year

Contact Prof I Fourie ina.fourie@up.ac.za +27 (0)124205216

Admission requirements

- BIS Information Science/Multimedia/Publishing degree or an equivalent bachelor's degree, and an average of at least 60% for relevant third-year modules. No experiential or work-integrated learning will be considered.
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and to decide if the applicant may be admitted.

Additional requirements

Consult G Regulations G.16 to G.29.

Other programme-specific information

Subject to the provisions of G Regulation G.18.3, a full-time student must complete his or her studies for an honours degree within two academic years (four semesters) and an after-hours student within three academic years (six semesters) after first registration for the degree. However, the Dean may, on the recommendation of the relevant head of department, extend the period of study in both cases by a maximum of two semesters.

Please Note:

The semester in which the module is offered may vary from year to year. Please see the departmental website.

Curriculum: Final year

Minimum credits: 120

Select any three electives (45 credits) in collaboration with the package organiser.

Fundamental modules

Research methodology 711 (INY 711) - Credits: 15.00

Research report 734 (INY 734) - Credits: 30.00

Core modules

Information and knowledge management (I) 713 (INY 713) - Credits: 15.00

Information behaviour, retrieval and organisation 714 (INY 714) - Credits: 15.00

Elective modules

Information ethics 715 (INY 715) - Credits: 15.00
Information and knowledge management (II) 716 (INY 716) - Credits: 15.00
Data management 717 (INY 717) - Credits: 15.00
Fourth industrial revolution 722 (INY 722) - Credits: 15.00
Competitive intelligence (I) 726 (INY 726) - Credits: 15.00
Competitive intelligence (II) 727 (INY 727) - Credits: 15.00
Information communication 730 (INY 730) - Credits: 15.00

BISHons Multimedia (12240007)

Minimum duration of study 1 year

Contact Mr JW de Beer koos.debeer@up.ac.za +27 (0)124202833

Admission requirements

- BIS (Multimedia) degree or an equivalent bachelor's degree, and an average of at least 60% in the third-year Multimedia modules and the third-year Computer Science modules. If the average for the third-year Multimedia or Computer Science modules is between 55% and 60%, the applicant's academic record will be evaluated according to the completion time of the undergraduate degree, the number of modules failed and the weighted average of each year.
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and to decide if the applicant may be admitted.

Additional requirements

Also consult G Regulations G.16 to G.29.

Other programme-specific information

Subject to the provisions of G Regulation G.18.3, a full-time student must complete his or her studies for an honours degree within two academic years (four semesters) and an after-hours student within three academic years (six semesters) after first registration for the degree. However, the Dean may, on the recommendation of the relevant head of department, extend the period of study in both cases by a maximum of two semesters.

A maximum of two modules may also be selected as electives from the other departments in the School of Information Technology.

Curriculum: Final year

Minimum credits: 120

Fundamental modules

Research methodology 711 (INY 711) - Credits: 15.00

Core modules

Multimedia research project 761 (IMY 761) - Credits: 30.00

Hypermedia and mark-up languages 772 (IMY 772) - Credits: 15.00

Elective modules

Multimedia trends 771 (IMY 771) - Credits: 15.00

Multimedia technology 773 (IMY 773) - Credits: 15.00

Virtual environments 774 (IMY 774) - Credits: 15.00
Animation theory and practice 777 (IMY 777) - Credits: 15.00
Human-computer interaction 779 (IMY 779) - Credits: 15.00

BISHons Publishing (12240008)

Minimum duration of study 1 year

Contact Prof EH le Roux beth.leroux@up.ac.za +27 (0)124202426

Admission requirements

- BIS Information Science/Multimedia/Publishing degree or an equivalent bachelor's degree, and an average of at least 65% for relevant third-year modules.
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and to decide if the applicant may be admitted.

Additional requirements

Consult G Regulations G.16 to G.29.

Other programme-specific information

Subject to the provisions of G Regulation G.18.3, a full-time student must complete his or her studies for an honours degree within two academic years (four semesters) and an after-hours student within three academic years (six semesters) after first registration for the degree. However, the Dean may, on the recommendation of the relevant head of department, extend the period of study in both cases by a maximum of two semesters.

Curriculum: Final year

Minimum credits: 120

Select two of the following modules or any other relevant modules in collaboration with the package organiser.

Fundamental modules

Research methodology 711 (INY 711) - Credits: 15.00

Core modules

Publishing management: Management and finance 722 (PUB 722) - Credits: 15.00

Publishing management: Organisation and processes 723 (PUB 723) - Credits: 15.00

Research project 1: The South African publishing environment 724 (PUB 724) - Credits: 15.00

Research project 2: The international publishing environment 725 (PUB 725) - Credits: 15.00

Editorial practice: Advanced copy-editing and editorial project management 728 (PUB 728) - Credits: 15.00

Elective modules

Advanced e-publishing 712 (PUB 712) - Credits: 15.00

Editorial practice: List building and acquisition of rights 729 (PUB 729) - Credits: 15.00

Book history 732 (PUB 732) - Credits: 15.00

BITHons Information Systems (12245000)

Minimum duration of study 1 year

Admission requirements

A Bachelor's degree in Information Technology/Informatics/Information Systems with an average mark of at least 60% for the Information Technology/Informatics/Information Systems modules at third-year level.

Other programme-specific information

The Department reserves the right not to present a particular module if the specific expertise is not available in a particular year.

Curriculum: Final year

Minimum credits: 120

Core modules

Research report 780 (INF 780) - Credits: 30.00

Elective modules

Capita selecta 713 (INF 713) - Credits: 15.00

Enterprise architecture 715 (INF 715) - Credits: 15.00

Capita selecta 716 (INF 716) - Credits: 15.00

Data warehousing 785 (INF 785) - Credits: 15.00

Management of ICT projects 787 (INF 787) - Credits: 15.00

Information systems development 788 (INF 788) - Credits: 15.00

Human-computer interaction 790 (INF 790) - Credits: 15.00

Applied data science 791 (INF 791) - Credits: 15.00

Management of information systems 794 (INF 794) - Credits: 15.00

Information and communications technology law 780 (KUB 780) - Credits: 15.00

BLArchHons (12242008)

Minimum duration of study 1 year

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	Dr N Botes	nico.botes@up.ac.za	+27 (0)124204600

Programme information

Also refer to G Regulations G.16 to G.29 and G.54.

Admission requirements

- A BScLArch degree or an equivalent university degree; or an applicable tertiary qualification that includes relevant modules at NQF level 7 (or NQF level 6 for qualifications obtained before 2009).
- The departmental Postgraduate Committee may require an evaluation in fields of knowledge (including relevant computer skills) and registration for additional modules for non-degree purposes.
- Applicants who completed the BScLArch at the University of Pretoria with a minimum of 70% average in the final year of study (including 70% for design in the final year) and completed all third-year modules in the same

academic year, will be granted admission after a year of practical experience. A portfolio of visual work must be submitted.

- All other applicants must have practical experience and/or a record of an extended study excursion, and are interviewed for selection.
- A limited number of applicants are admitted to this programme. Refer to the departmental website for guidelines.

Other programme-specific information

Awarding of degree

The degree is awarded to those students who have obtained the prescribed credits. Students admitted with conditions must comply with all of these before all 700 series module credits and the degree are awarded.

Examinations and pass requirements

The minimum pass mark is 50%. A minimum of 40% is required in the examination, with a minimum final mark of 50% to pass. If a module is not evaluated by examination a minimum coursework mark of 50% is required. If the module is not evaluated by coursework a minimum examination mark of 50% is required.

Pass with distinction

The degree is conferred with distinction if students registered for the degree for the first time, complete the degree within the minimum prescribed time and pass all modules with a weighted average of 75%.

Curriculum: Final year

Minimum credits: 120

Core modules

Continuing practice development 710 (CPD 710) - Credits: 6.00

Continuing practice development 720 (CPD 720) - Credits: 6.00

Continuing practice development 730 (CPD 730) - Credits: 6.00

Continuing practice development 740 (CPD 740) - Credits: 6.00

Research field project 712 (RFP 712) - Credits: 16.00

Research field project 720 (RFP 720) - Credits: 16.00

Research field project 722 (RFP 722) - Credits: 16.00

Research field project 732 (RFP 732) - Credits: 16.00

Research field studies 720 (RFS 720) - Credits: 32.00

BScHons Applied Science Architecture (12242001)

Minimum duration of study 1 year

Contact	Prof C Combrinck	carin.combrinck@up.ac.za	+27 (0)124206536
	Dr N Botes	nico.botes@up.ac.za	+27 (0)124204600

Programme information

This degree is for those students intending hereafter to pursue a master's degree by research and coursework in applied science in the fields of architecture, landscape architecture or interior architecture or generally in the built environment.

Refer to G Regulations G.16 to G.29 and G.54.

Admission requirements

- A BSc degree or an equivalent tertiary qualification at NQF level 7 (or NQF level 6 for qualifications obtained before 2009) in one of the recognised disciplines of interest to the department: urban design, civil engineering, planning, construction, geography, visual arts, ecology, or any other field deemed acceptable by the departmental Postgraduate Committee.
- An applicant's specific field of interest must be related to one of the research fields of the department.
- The departmental Postgraduate Committee may require an evaluation in fields of knowledge (including relevant computer skills) and registration for additional modules for non-degree purposes.
- All other applicants must have practical experience and/or a record of an extended study excursion, and are interviewed for selection.
- A limited number of applicants are admitted to this programme. Refer to the departmental website for guidelines.

Other programme-specific information

Students who follow modules presented by other schools or faculties must first obtain permission for such registration(s) from those schools or faculties and must familiarise themselves with the admission requirements of the specific module(s), and the examination rules and regulations pertaining to such a module(s).

(Please Note: it is the students' responsibility to have their projects approved by the specific research field coordinator)

Course work modules at honours level (700) presented by other departments, schools or faculties (maximum 30 credits) . Students may register for other honours (700) level modules presented in the Department of Architecture with the approval of the Head of Department.

Awarding of degree

The degree is awarded to those students who have obtained the prescribed credits. Those students admitted with conditions must comply with all of these before all the 700 series module credits and the degree are awarded.

Examinations and pass requirements

The minimum pass mark is 50%. A minimum of 40% is required in the examination, with a minimum final mark of 50% to pass. If a module is not evaluated by examination a minimum coursework mark of 50% is required. If the module is not evaluated by coursework a minimum examination mark of 50% is required.

Research information

The G Regulation G.39.12 applies.

Pass with distinction

The degree is conferred with distinction if students registered for the degree for the first time, complete the degree within the minimum prescribed time and pass all modules with a weighted average of 75%.

Curriculum: Final year

Minimum credits: 120

In addition to the prescribed 90 credits, a student must do a 700-level module(s) for 30 credit from other departments, schools or faculties. Students may also register for 700-level modules presented by the Department of Architecture, with the permission of the Head of Department.

Core modules

Project component (Capita selecta) 700 (RFP 700) - Credits: 60.00

Theory component (Capita selecta) 700 (RFS 700) - Credits: 30.00

BScHons Applied Science Chemical Technology (12243004)

Minimum duration of study 1 year

Programme information

The BScHons (Applied Science) degree is conferred by the following academic departments:

- Chemical Engineering
- Civil Engineering
- Industrial and Systems Engineering
- Materials Science and Metallurgical Engineering
- Mechanical and Aeronautical Engineering
- Mining Engineering

Any specific module is offered on the condition that a minimum number of students are registered for the module, as determined by the relevant head of department and the Dean. Students must consult the relevant head of department in order to compile a meaningful programme, as well as on the syllabi of the modules. The relevant departmental postgraduate brochures must also be consulted.

Admission requirements

- Any one of the following:
 - a three-year BSc degree (in natural sciences) (or equivalent) with a weighted average of at least 60%;
 - an appropriate BTech qualification, i.e. one offered by a department of chemical engineering at a university of technology in South Africa, with a weighted average of at least 75% and no modules failed in the BTech, excluding the National Diploma;
 - a four-year engineering-based university degree not recognised by ECSA for registration as a professional engineer.
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.
- A full year of Mathematics, Physics and Chemistry must have been passed at least at first-year level. Modules entitled "Introductory", "Elementary" or "Basic" will not be regarded as acceptable.

Other programme-specific information

A limited number of appropriate postgraduate modules from other departments are allowed. Not all modules listed are presented each year. Please consult the departmental postgraduate brochure.

Specialisation in Process Technology is possible by registering for specific modules. (Please note that a candidate selecting this option will not be allowed to register for any modules at 700-level before the modules of the first

semester at 400-level had been completed successfully.) Please consult the department.

Curriculum: Final year

Minimum credits: 128

Core modules

Bioprocessing 732 (CBP 732) - Credits: 32.00

Fluoro-materials science research and technology 732 (CFT 732) - Credits: 32.00

Chemical engineering 707 (CIR 707) - Credits: 32.00

Chemical engineering 787 (CIR 787) - Credits: 16.00

Carbon materials science research and technology 732 (CMS 732) - Credits: 32.00

Product design 732 (CPO 732) - Credits: 32.00

Polymer processing 732 (CPP 732) - Credits: 32.00

Polymer materials science and research 732 (CPW 732) - Credits: 32.00

Separation technology 732 (CSK 732) - Credits: 32.00

Additive technology 732 (CYM 732) - Credits: 32.00

BScHons Applied Science Environmental Technology (12243008)

Minimum duration of study 1 year

Programme information

The BScHons (Applied Science) degree is conferred by the following academic departments:

- Chemical Engineering
- Civil Engineering
- Industrial and Systems Engineering
- Materials Science and Metallurgical Engineering
- Mechanical and Aeronautical Engineering
- Mining Engineering

Any specific module is offered on the condition that a minimum number of students are registered for the module, as determined by the relevant head of department and the Dean. Students must consult the relevant head of department in order to compile a meaningful programme, as well as on the syllabi of the modules. The relevant departmental postgraduate brochures must also be consulted.

Admission requirements

1. Three-year BSc (or equivalent) degree (in Natural Sciences) with a cumulative weighted average of at least 60% for the degree and a full year of Mathematics, Physics and Chemistry passed at least at first-year level (modules entitled "Introductory", "Elementary" or "Basic" will not be regarded as acceptable) or relevant BTech qualification excluding the National Diploma; i.e. one offered by a department of chemical engineering at a university of technology in South Africa with a cumulative weighted average of at least 75% for the degree and

no modules failed in the BTech degree

or

four-year engineering-based university degree not recognised by ECSA for registration as a professional engineer

and

a full year of Mathematics, Physics and Chemistry passed at least at first-year level (modules entitled “Introductory”, “Elementary” or “Basic” will not be regarded as acceptable)

or

BEng degree awarded by the University of Pretoria

or

relevant four-year bachelor’s degree in engineering that the Engineering Council of South Africa (ECSA) regards as acceptable for registration as a candidate engineer and for eventual registration as a professional engineer

2. An entrance examination may be required

3. Comprehensive intellectual CV

Other programme-specific information

A limited number of appropriate postgraduate modules from other departments are allowed. Not all modules listed are presented each year. Please consult the departmental postgraduate brochure.

Curriculum: Final year

Minimum credits: 128

Core modules

Air quality control 787 (CAM 787) - Credits: 32.00

Principles of environmental engineering 787 (CEM 787) - Credits: 32.00

Industrial waste engineering 787 (WAI 787) - Credits: 32.00

Water quality management and research 787 (WQB 787) - Credits: 32.00

BScHons Applied Science Geotechnics (12243005)

Minimum duration of study 1 year

Programme information

The BScHons (Applied Science) degree is conferred by the following academic departments:

- Chemical Engineering
- Civil Engineering
- Industrial and Systems Engineering
- Materials Science and Metallurgical Engineering
- Mechanical and Aeronautical Engineering
- Mining Engineering

Any specific module is offered on the condition that a minimum number of students are registered for the module, as determined by the relevant head of department and the Dean. Students must consult the relevant head of department in order to compile a meaningful programme, as well as on the syllabi of the modules. The relevant departmental postgraduate brochures must also be consulted.

Admission requirements

- Any one of the following:
 - a three-year BSc degree (in natural sciences) (or equivalent) with a weighted average of at least 60%;
 - an appropriate BTech qualification, i.e. one offered by a department of civil engineering at a university of technology in South Africa, with a weighted average of at least 75% and no modules failed in the BTech, excluding the National Diploma;
 - a four-year engineering-based university degree not recognised by ECSA for registration as a professional engineer.
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.

Other programme-specific information

The remainder of the credits to be chosen from the modules prescribed for the BEngHons (Geotechnical Engineering) programme, as approved by the head of department, and after completion of the appropriate modules as listed.

Curriculum: Final year

Minimum credits: 128

SHC 797 must be passed before other modules are registered.

Core modules

[Analytical soil mechanics 787](#) (SGS 787) - Credits: 24.00
[Theoretical soil mechanics 788](#) (SGS 788) - Credits: 24.00
[Specialised geotechnical testing 789](#) (SGS 789) - Credits: 24.00
[Basic statistical methods 797](#) (SHC 797) - Credits: 24.00
[Civil research 780](#) (SSC 780) - Credits: 32.00

BScHons Applied Science Industrial Systems (12243002)

Minimum duration of study 1 year

Programme information

The curriculum is determined in consultation with the relevant heads of departments. A student is required to pass modules to the value of at least 128 credits.

The degree is awarded on the basis of examinations only.

The BScHons (Applied Science) degree is conferred by the following academic departments:

- Chemical Engineering
- Civil Engineering
- Industrial and Systems Engineering
- Materials Science and Metallurgical Engineering
- Mechanical and Aeronautical Engineering
- Mining Engineering

Any specific module is offered on the condition that a minimum number of students are registered for the

module, as determined by the relevant head of department and the Dean. Students must consult the relevant head of department in order to compile a meaningful programme, as well as on the syllabi of the modules. The relevant departmental postgraduate brochures must also be consulted.

Admission requirements

- Any one of the following:
 - a three-year BSc degree (in natural sciences) (or equivalent) with a weighted average of at least 60%;
 - an appropriate BTech qualification, i.e. one offered by a department of industrial engineering at a university of technology in South Africa, with a weighted average of at least 75% and no modules failed in the BTech, excluding the National Diploma;
 - a four-year engineering-based university degree not recognised by ECSA for registration as a professional engineer.
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.

Other programme-specific information

The programme consists of two compulsory modules (48 credits) with any relevant core module as prerequisite and the remainder of credits either core and/or elective modules. Students are allowed 16 relevant credits from outside the department. Students are advised to select modules in line with their desired research stream:

- Resource Optimisation (RO)
- Business Process Optimisation (BPO)
- Supply Chain Engineering (SCE)

Please refer to the Programme Guide for further information, available [here](#).

Curriculum: Final year

Minimum credits: 128

BCS 780 and BAN 780 are compulsory modules.

Core modules

[Industrial analysis 780](#) (BAN 780) - Credits: 16.00

[Enterprise engineering and research methods 781](#) (BBA 781) - Credits: 32.00

[Industrial and systems engineering research 780](#) (BCS 780) - Credits: 32.00

[Supply chain processes 781](#) (BLK 781) - Credits: 16.00

[Operations research 780](#) (BOZ 780) - Credits: 32.00

[Manufacturing planning systems 782](#) (BPZ 782) - Credits: 32.00

[Simulation modelling 780](#) (BUY 780) - Credits: 32.00

[Supply chain design 780](#) (BVK 780) - Credits: 16.00

Elective modules

[Reliability engineering 780](#) (BTH 780) - Credits: 16.00

BScHons Applied Science Mechanics (12243006)

Minimum duration of study 1 year

Programme information

The curriculum is determined in consultation with the relevant heads of departments. A student is required to pass modules to the value of at least 128 credits.

The degree is awarded on the basis of examinations only.

The BScHons (Applied Science) degree is conferred by the following academic departments:

- Chemical Engineering
- Civil Engineering
- Industrial and Systems Engineering
- Materials Science and Metallurgical Engineering
- Mechanical and Aeronautical Engineering
- Mining Engineering

Any specific module is offered on the condition that a minimum number of students are registered for the module, as determined by the relevant head of department and the Dean. Students must consult the relevant head of department in order to compile a meaningful programme, as well as on the syllabi of the modules. The relevant departmental postgraduate brochures must also be consulted.

Admission requirements

1. Three-year BSc (or equivalent) degree (in Natural Sciences) with a cumulative weighted average of at least 60% for the degree **or** relevant BTech qualification excluding the National Diploma; i.e. one offered by a department of mechanical engineering at a university of technology in South Africa with a cumulative weighted average of at least 75% for the degree and no modules failed in the BTech degree **or** four-year engineering-based university degree not recognised by ECSA for registration as a professional engineer
2. An entrance examination may be required
3. Comprehensive intellectual CV

Other programme-specific information

All students must complete the module MSS 732 Research study 732.

A limited number of appropriate modules from other departments are allowed. Not all modules listed are presented each year. Please consult the postgraduate brochure found on the [departmental website](#) for further information.

Examinations and pass requirements

- i. The examination in each module for which a student is registered, takes place during the normal examination period after the conclusion of lectures (i.e. October/November or May/June).
- ii. A student registered for the honours degree must complete his or her studies within two years (full-time), or within three years (part-time) after first registration for the degree: Provided that the Dean, on recommendation of the relevant head of department, may approve a stipulated limited extension of this period.
- iii. A student must obtain at least 50% in an examination for each module where no semester or year mark is required. A module may only be repeated once.
- iv. In modules where semester or year marks are awarded, a minimum examination mark of 40% and a final mark of 50% is required.

v. No supplementary or special examinations are granted at postgraduate level.

Pass with distinction

A student passes with distinction if he or she obtains a weighted average of at least 75% in the first 128 credits for which he or she has registered (excluding modules which were discontinued timeously). The degree is not awarded with distinction if a student fails any one module (excluding modules which were discontinued timeously). The degree must be completed within the prescribed study period.

Curriculum: Final year

Minimum credits: 128

MSS 732 is a compulsory module and should be selected by all students as a core module.

When selecting your other core and elective modules, please consult the Departmental Brochure.

Core modules

Maintenance practice 780 (MIP 780) - Credits: 16.00

Reliability engineering 781 (MIR 781) - Credits: 16.00

Aerodynamics 780 (MLD 780) - Credits: 16.00

Flight mechanics 780 (MLV 780) - Credits: 16.00

Research study 732 (MSS 732) - Credits: 32.00

Fatigue 780 (MSV 780) - Credits: 16.00

Fluid mechanics 780 (MSX 780) - Credits: 16.00

Numerical methods 780 (MWN 780) - Credits: 16.00

Elective modules

Control Systems 780 (MBB 780) - Credits: 16.00

Non-destructive testing 780 (MCT 780) - Credits: 16.00

Advanced finite element methods 781 (MEE 781) - Credits: 16.00

Mechatronics 780 (MEG 780) - Credits: 16.00

Vibration-based condition monitoring 781 (MEV 781) - Credits: 16.00

Advanced heat and mass transfer 780 (MHM 780) - Credits: 16.00

Condition-based maintenance 780 (MIC 780) - Credits: 16.00

Maintenance logistics 782 (MIP 782) - Credits: 16.00

Unmanned aircraft systems technology 783 (MLD 783) - Credits: 16.00

Avionics 784 (MLD 784) - Credits: 16.00

Air conditioning and refrigeration 780 (MLR 780) - Credits: 16.00

Optimum design 780 (MOO 780) - Credits: 16.00

Fracture mechanics 780 (MSF 780) - Credits: 16.00

Numerical thermoflow 780 (MSM 780) - Credits: 16.00

Numerical thermoflow 781 (MSM 781) - Credits: 16.00

Advanced thermodynamics and energy systems 781 (MTX 781) - Credits: 16.00

Reactor coolant flow and heat transfer 782 (MUA 782) - Credits: 16.00

Reactor engineering science 783 (MUA 783) - Credits: 16.00

Reactor physics 784 (MUA 784) - Credits: 16.00

Reactor materials engineering 785 (MUA 785) - Credits: 16.00

Reactor materials engineering 786 (MUA 786) - Credits: 16.00

Fossil fuel power stations 781 (MUU 781) - Credits: 16.00

Vehicle dynamics 780 (MVI 780) - Credits: 16.00

BScHons Applied Science Mechanics: Physical Asset Management (12243037)

Minimum duration of study 1 year

Programme information

This multidisciplinary programme exposes students to both the management as well as the technical aspects of Physical Asset Management from a theoretical perspective. Students will, however, have to choose whether they would prefer to conduct the research component of the programme in either the technical domain (register with the Department of Mechanical and Aeronautical Engineering) or in the management domain (register with the Graduate School of Technology Management).

The BScHons (Applied Science) degree is conferred by the following academic departments:

- Chemical Engineering
- Civil Engineering
- Industrial and Systems Engineering
- Materials Science and Metallurgical Engineering
- Mechanical and Aeronautical Engineering
- Mining Engineering

Any specific module is offered on the condition that a minimum number of students are registered for the module, as determined by the relevant head of department and the Dean. Students must consult the relevant head of department in order to compile a meaningful programme, as well as on the syllabi of the modules. The relevant departmental postgraduate brochures must also be consulted.

Admission requirements

- Any one of the following:
 - A BEng (or equivalent)
 - a three-year BSc degree (in Natural Sciences) (or equivalent) with a weighted average of at least 60%;
 - a BTech qualification in an engineering discipline awarded by a university of technology in South Africa, with a weighted average of at least 75% and no modules failed in the BTech, excluding the National Diploma;
 - a four-year engineering-based university degree not recognised by ECSA for registration as a professional engineer.
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.

Other programme-specific information

The curriculum comprises four core modules, two elective modules and a compulsory research project.

Any specific module is offered on the condition that a minimum number of students are registered for the module, as determined by the relevant head of department and the Dean.

All students must complete the module MSS 732 Research study 732.

A limited number of appropriate modules from other departments are allowed. Not all modules listed are presented each year. Please consult the postgraduate brochure found on the [departmental website](#) for further information.

Examinations and pass requirements

- i. The examination in each module for which a student is registered, takes place during the normal examination period after the conclusion of lectures (i.e. October/November or May/June).
- ii. A student registered for the honours degree must complete his or her studies within two years (full-time), or within three years (part-time) after first registration for the degree: Provided that the Dean, on recommendation of the relevant head of department, may approve a stipulated limited extension of this period.
- iii. A student must obtain at least 50% in an examination for each module where no semester or year mark is required. A module may only be repeated once.
- iv. In modules where semester or year marks are awarded, a minimum examination mark of 40% and a final mark of 50% is required.
- v. No supplementary or special examinations are granted at postgraduate level.

Pass with distinction

A student passes with distinction if he or she obtains a weighted average of at least 75% in the first 128 credits for which he or she has registered (excluding modules which were discontinued timeously). The degree is not awarded with distinction if a student fails any one module (excluding modules which were discontinued timeously). The degree must be completed within the prescribed study period.

Curriculum: Final year

Minimum credits: 128

MSS 732 is a compulsory module and should be selected by all students as a core module.

When selecting your elective modules, please consult the Departmental Brochure.

Core modules

Engineering technology economics 780 (IKN 780) - Credits: 16.00

Maintenance and asset management 780 (IMC 780) - Credits: 16.00

Maintenance practice 780 (MIP 780) - Credits: 16.00

Reliability engineering 781 (MIR 781) - Credits: 16.00

Research study 732 (MSS 732) - Credits: 32.00

Elective modules

Project management 780 (IPK 780) - Credits: 16.00

Systems thinking and engineering 780 (ISE 780) - Credits: 16.00

Non-destructive testing 780 (MCT 780) - Credits: 16.00

Vibration-based condition monitoring 781 (MEV 781) - Credits: 16.00

Condition-based maintenance 780 (MIC 780) - Credits: 16.00

Maintenance logistics 782 (MIP 782) - Credits: 16.00

Fossil fuel power stations 781 (MUU 781) - Credits: 16.00

BScHons Applied Science Metallurgy (12243007)

Minimum duration of study 1 year

Programme information

The BScHons (Applied Science) degree is conferred by the following academic departments:

- Chemical Engineering
- Civil Engineering
- Industrial and Systems Engineering
- Materials Science and Metallurgical Engineering
- Mechanical and Aeronautical Engineering
- Mining Engineering

Any specific module is offered on the condition that a minimum number of students are registered for the module, as determined by the relevant head of department and the Dean. Students must consult the relevant head of department in order to compile a meaningful programme, as well as on the syllabi of the modules. The relevant departmental postgraduate brochures must also be consulted.

Admission requirements

- Any one of the following:
 - a three-year BSc degree (in natural sciences) (or equivalent) with a weighted average of at least 60%;
 - an appropriate BTech qualification, i.e. one offered by a department of metallurgical engineering at a university of technology in South Africa, with a weighted average of at least 75% and no modules failed in the BTech, excluding the National Diploma;
 - a four-year engineering-based university degree not recognised by ECSA for registration as a professional engineer.
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.

Other programme-specific information

A limited number of appropriate modules from other departments and from other divisions of Chemical Engineering are allowed. Not all modules listed are presented each year. Please consult the departmental postgraduate brochure.

Curriculum: Final year

Minimum credits: 120

NLO 700 is a compulsory research module (30 credits).

Select one of the other three core modules listed (30 credits) and two modules from the list of electives (60 credits).

Core modules

Basic physical metallurgy 701 (NFM 701) - Credits: 30.00

Basic extractive metallurgy 701 (NHM 701) - Credits: 30.00

Research project 700 (NLO 700) - Credits: 30.00

Basic pyrometallurgy 701 (NPM 701) - Credits: 30.00

Elective modules

Electrometallurgy 700 (NEL 700) - Credits: 30.00

Fabrication engineering 700 (NFE 700) - Credits: 30.00

Physical metallurgy 700 (NFM 700) - Credits: 30.00
Heat treatment 700 (NHB 700) - Credits: 30.00
Hydrometallurgy 700 (NHM 700) - Credits: 30.00
Corrosion 700 (NKR 700) - Credits: 30.00
Mechanical metallurgy 700 (NMM 700) - Credits: 30.00
Minerals processing 700 (NMP 700) - Credits: 30.00
Applied theory of sampling for minerals processing 701 (NMP 701) - Credits: 30.00
Pyrometallurgy 700 (NPM 700) - Credits: 30.00
Froth flotation 700 (NSF 700) - Credits: 30.00
Welding metallurgy 700 (NSW 700) - Credits: 30.00
Refractory materials 700 (NVM 700) - Credits: 30.00
Welding processes 700 (NWP 700) - Credits: 30.00
Design of welded structures 701 (NWP 701) - Credits: 30.00

BScHons Applied Science Metallurgy: Welding Technology (12243036)

Minimum duration of study 1 year

Programme information

The BScHons (Applied Science) degree is conferred by the following academic departments:

- Chemical Engineering
- Civil Engineering
- Industrial and Systems Engineering
- Materials Science and Metallurgical Engineering
- Mechanical and Aeronautical Engineering
- Mining Engineering

Any specific module is offered on the condition that a minimum number of students are registered for the module, as determined by the relevant head of department and the Dean. Students must consult the relevant head of department in order to compile a meaningful programme, as well as on the syllabi of the modules. The relevant departmental postgraduate brochures must also be consulted.

Admission requirements

- Any one of the following:
 - a three-year BSc degree (in natural sciences) (or equivalent) with a weighted average of at least 60%;
 - an appropriate BTech qualification, i.e. one offered by a department of metallurgical engineering at a university of technology in South Africa, with a weighted average of at least 75% and no modules failed in the BTech, excluding the National Diploma;
 - a four-year engineering-based university degree not recognised by ECSA for registration as a professional engineer.
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.

Curriculum: Final year

Minimum credits: 150

Core modules

Fabrication engineering 700 (NFE 700) - Credits: 30.00

Research project 700 (NLO 700) - Credits: 30.00

Welding metallurgy 700 (NSW 700) - Credits: 30.00

Welding processes 700 (NWP 700) - Credits: 30.00

Design of welded structures 701 (NWP 701) - Credits: 30.00

BScHons Applied Science Mining (12243035)

Minimum duration of study 1 year

Programme information

The BScHons (Applied Science) degree is conferred by the following academic departments:

- Chemical Engineering
- Civil Engineering
- Industrial and Systems Engineering
- Materials Science and Metallurgical Engineering
- Mechanical and Aeronautical Engineering
- Mining Engineering

Any specific module is offered on the condition that a minimum number of students are registered for the module, as determined by the relevant head of department and the Dean. Students must consult the relevant head of department in order to compile a meaningful programme, as well as on the syllabi of the modules. The relevant departmental postgraduate brochures must also be consulted.

Admission requirements

- Any one of the following:
 - a three-year BSc degree (in Natural Sciences) (or equivalent) with a weighted average of at least 60%;
 - an appropriate BTech qualification, i.e. one offered by a department of mining engineering at a university of technology in South Africa, with a weighted average of at least 75% and no modules failed in the BTech, excluding the National Diploma;
 - a four-year engineering-based university degree not recognised by ECSA for registration as a professional engineer.
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.

Curriculum: Final year

Minimum credits: 128

All modules compulsory / Alle modules verpligtend

Core modules

Basic mine ventilation engineering 701 (PKB 701) - Credits: 16.00

Underground mining methods 701 (PMY 701) - Credits: 32.00

Surface-mining 703 (PMY 703) - Credits: 16.00

Explosives engineering 701 (PRX 701) - Credits: 16.00

Research project 700 (PSS 700) - Credits: 32.00

Basic rock mechanics 703 (PSZ 703) - Credits: 16.00

BScHons Applied Science Structure (12243034)

Minimum duration of study 1 year

Programme information

The BScHons (Applied Science) degree is conferred by the following academic departments:

- Chemical Engineering
- Civil Engineering
- Industrial and Systems Engineering
- Materials Science and Metallurgical Engineering
- Mechanical and Aeronautical Engineering
- Mining Engineering

Any specific module is offered on the condition that a minimum number of students are registered for the module, as determined by the relevant head of department and the Dean. Students must consult the relevant head of department in order to compile a meaningful programme, as well as on the syllabi of the modules. The relevant departmental postgraduate brochures must also be consulted.

Admission requirements

- Any one of the following:
 - a three-year BSc degree (in natural sciences) (or equivalent) with a weighted average of at least 60%;
 - an appropriate BTech qualification, i.e. one offered by a department of civil engineering at a university of technology in South Africa, with a weighted average of at least 75% and no modules failed in the BTech, excluding the National Diploma;
 - a four-year engineering-based university degree not recognised by ECSA for registration as a professional engineer.
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.

Other programme-specific information

The remainder of the credits to be chosen from the modules prescribed for the BEngHons (Structural Engineering) programme, as approved by the relevant head of department, and after completion of the appropriate modules as listed.

Curriculum: Final year

Minimum credits: 128

Core modules

Civil research 780 (SSC 780) - Credits: 32.00

Elective modules

Structural mechanics 777 (SIN 777) - Credits: 24.00

Pre-stressed concrete design 791 (SIN 791) - Credits: 24.00

Infrastructure management 790 (SSI 790) - Credits: 24.00

BScHons Applied Science Transportation Planning (12243009)

Minimum duration of study 1 year

Programme information

The BScHons (Applied Science) degree is conferred by the following academic departments:

- Chemical Engineering
- Civil Engineering
- Industrial and Systems Engineering
- Materials Science and Metallurgical Engineering
- Mechanical and Aeronautical Engineering
- Mining Engineering

Any specific module is offered on the condition that a minimum number of students are registered for the module, as determined by the relevant head of department and the Dean. Students must consult the relevant head of department in order to compile a meaningful programme, as well as on the syllabi of the modules. The relevant departmental postgraduate brochures must also be consulted.

Admission requirements

- Any one of the following:
 - a three-year BSc degree (in natural sciences) (or equivalent) with a weighted average of at least 60%;
 - an appropriate BTech qualification, i.e. one offered by a department of civil engineering at a university of technology in South Africa, with a weighted average of at least 75% and no modules failed in the BTech, excluding the National Diploma;
 - a four-year engineering-based university degree not recognised by ECSA for registration as a professional engineer.
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.

Other programme-specific information

The remainder of the credits to be chosen from the modules for the BEngHons (Transportation Engineering) programme, as approved by the relevant head of department, and after completion of the appropriate modules as listed.

Curriculum: Final year

Minimum credits: 128

Core modules

Basic pavements and transportation 787 (SGM 787) - Credits: 24.00

Basic statistical methods 797 (SHC 797) - Credits: 24.00

Civil research 780 (SSC 780) - Credits: 32.00

Elective modules

Pavement design 793 (SGC 793) - Credits: 24.00

Infrastructure management 790 (SSI 790) - Credits: 24.00

Transportation studies 790 (SVC 790) - Credits: 24.00

Transportation special 791 (SVC 791) - Credits: 24.00

Traffic engineering 792 (SVC 792) - Credits: 24.00

BScHons Applied Science Water Resources (12243033)

Minimum duration of study 1 year

Programme information

The BScHons (Applied Science) degree is conferred by the following academic departments:

- Chemical Engineering
- Civil Engineering
- Industrial and Systems Engineering
- Materials Science and Metallurgical Engineering
- Mechanical and Aeronautical Engineering
- Mining Engineering

Any specific module is offered on the condition that a minimum number of students are registered for the module, as determined by the relevant head of department and the Dean. Students must consult the relevant head of department in order to compile a meaningful programme, as well as on the syllabi of the modules. The relevant departmental postgraduate brochures must also be consulted.

Admission requirements

- Any one of the following:
 - a three-year BSc degree (in natural sciences) (or equivalent) with a weighted average of at least 60%;
 - an appropriate BTech qualification, i.e. one offered by a department of civil engineering at a university of technology in South Africa, with a weighted average of at least 75% and no modules failed in the BTech, excluding the National Diploma;
 - a four-year engineering-based university degree not recognised by ECSA for registration as a professional engineer.
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.

Other programme-specific information

The remainder of the modules must be chosen from the modules prescribed for the BEngHons (Water Resource Engineering) programme, as approved by the head of department, and after completion of the appropriate modules as listed.

Curriculum: Final year

Minimum credits: 128

Core modules

Civil research 780 (SSC 780) - Credits: 32.00

Elective modules

Flood hydrology 792 (SHC 792) - Credits: 24.00

Pipe flow 795 (SHC 795) - Credits: 24.00

Infrastructure management 790 (SSI 790) - Credits: 24.00

BScHons Applied Science Water Utilisation (12243014)

Minimum duration of study 1 year

Programme information

The BScHons (Applied Science) degree is conferred by the following academic departments:

- Chemical Engineering
- Civil Engineering
- Industrial and Systems Engineering
- Materials Science and Metallurgical Engineering
- Mechanical and Aeronautical Engineering
- Mining Engineering

Any specific module is offered on the condition that a minimum number of students are registered for the module, as determined by the relevant head of department and the Dean. Students must consult the relevant head of department in order to compile a meaningful programme, as well as on the syllabi of the modules. The relevant departmental postgraduate brochures must also be consulted.

Admission requirements

- Any one of the following:
 - a three-year BSc degree (in natural sciences) (or equivalent) with a weighted average of at least 60%;
 - an appropriate BTech qualification, i.e. one offered by a department of chemical engineering at a university of technology in South Africa, with a weighted average of at least 75% and no modules failed in the BTech, excluding the National Diploma;
 - a four-year engineering-based university degree not recognised by ECSA for registration as a professional engineer.
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.
- A full year of Mathematics, Physics and Chemistry must have been passed at least at first-year level. Modules entitled "Introductory", "Elementary" or "Basic" will not be regarded as acceptable.

Other programme-specific information

A limited number of appropriate postgraduate modules from other departments are allowed. Not all modules listed are presented each year. Please consult the departmental postgraduate brochure.

Curriculum: Final year

Minimum credits: 128

Core modules

Industrial waste engineering 787 (WAI 787) - Credits: 32.00

Biological water treatment 787 (WBW 787) - Credits: 32.00

Chemical water treatment 787 (WCW 787) - Credits: 32.00

Water quality management and research 787 (WQB 787) - Credits: 32.00

BScHons Computer Science (12244001)

Minimum duration of study 1 year

Programme information

This degree programme is offered in English only. The degree is conferred on a student who successfully completes at least 120 credits of coursework in Computer Science at honours level. Consult G Regulations G.16 to G.29

Admission requirements

- A BSc degree, majoring in Computer Science, from a South African university (or an equivalent) with a weighted average of at least 60% over all third-year modules in the Computer Science major; or a BIS Multimedia degree from the University of Pretoria with a weighted average of at least 60% for COS 301 and at least three third-year Computer Science modules.
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and to decide if the applicant may be admitted.

Other programme-specific information

The Dean, on the recommendation of the relevant head of department, may approve a stipulated limited extension of the prescribed period of study.

Details regarding postgraduate modules are available at www.cs.up.ac.za

One elective module can be selected from outside the Department of Computer Science, subject to the approval of the programme manager, and provided that there are no lecture and exam clashes with Computer Science modules.

Examinations and pass requirements

In calculating marks, G Regulation G.12.2 is applicable. However, a student is required to obtain at least 50% in an examination in a module where no semester or year mark is required. In those cases where a year mark or semester mark is available, a subminimum of 40% must be obtained in the examination.

The Dean may, on the recommendation of the admissions committee, cancel the studies of a student who fails more than one module in an academic year. A module may only be repeated once. No supplementary examinations are granted at postgraduate level.

Pass with distinction

The BScHons degree is awarded with distinction to a candidate who obtains a weighted average of at least 75% in all the prescribed modules and who did not fail any module.

Curriculum: Final year

Minimum credits: 120

Core modules

Research report 700 (COS 700) - Credits: 30.00

Elective modules

Artificial intelligence (I) 710 (COS 710) - Credits: 15.00

Artificial Intelligence (II) 711 (COS 711) - Credits: 15.00

Computer and information security (I) 720 (COS 720) - Credits: 15.00

Computer and information security (II) 721 (COS 721) - Credits: 15.00

Software engineering (I) 730 (COS 730) - Credits: 15.00

Software engineering (II) 731 (COS 731) - Credits: 15.00

Formal aspects of computing (I) 740 (COS 740) - Credits: 15.00

Formal aspects of computing (II) 741 (COS 741) - Credits: 15.00

Educational software development 750 (COS 750) - Credits: 15.00

Data mining 781 (COS 781) - Credits: 15.00

Generic programming 782 (COS 782) - Credits: 15.00

Digital forensics and investigations 783 (COS 783) - Credits: 15.00

Computer networks 784 (COS 784) - Credits: 15.00

Computer graphics 785 (COS 785) - Credits: 15.00

Parallel and distributed computing 786 (COS 786) - Credits: 15.00

Information hiding 788 (COS 788) - Credits: 15.00

Special topics (I) 790 (COS 790) - Credits: 15.00

Special topics (II) 791 (COS 791) - Credits: 15.00

BScHons Construction Management (12242018)

Minimum duration of study 1 year

Contact Mr DE Booyens derick.booyens@up.ac.za +27 (0)124204433

Programme information

Consult General Regulations G.16 to G.29 and G.54.

A student is required to attend lectures diligently, but in addition the student must complete a compulsory non-credit bearing module (CWE 700) comprising a minimum of 240 hours of temporary employment with a suitable employer in the construction industry/built environment (registered quantity surveyor, contractor, developer, property owner, etc). As proof of the practical experience the student must submit an approved log book signed by the employer.

Admission requirements

A BSc (Construction Management) degree or an equivalent three-year bachelor's degree at NQF level 7 (or NQF level 6 for qualifications obtained before 2009) from an accredited institution.

An equivalent qualification is regarded as one that the South African Council for the Construction and Project Management Professions regards as acceptable for registration as a candidate construction manager or candidate project manager and for eventual registration as a professional construction manager or professional project manager.

Additional requirements

Selection is based on an applicant's academic record and experience. Applicants may be required to attend an interview and/or write an entrance examination.

Examinations and pass requirements

A minimum semester/year mark of 40% is required in order to be admitted to the examination in a specific module. In addition, all other examination admission requirements, applicable to the relevant module, must have been met. To pass a module a final mark of 50% is required.

Supplementary examinations

No supplementary examinations are granted at postgraduate level.

Special examinations

No special examinations are granted at postgraduate level.

The degree is awarded when all prescribed modules have been passed.

Pass with distinction

The degree is conferred with distinction if students registered for the degree for the first time, complete the degree within the minimum prescribed time and pass all modules with a weighted average of 75%.

Curriculum: Final year

Minimum credits: 124

Core modules

Practical work experience 700 (CWE 700) - Credits: 0.00
Feasibility studies 710 (EUS 710) - Credits: 8.00
Feasibility studies 720 (EUS 720) - Credits: 8.00
Construction finance 713 (FMT 713) - Credits: 10.00
Construction management 710 (KBS 710) - Credits: 10.00
Construction management 720 (KBS 720) - Credits: 10.00
Research report 785 (KBS 785) - Credits: 30.00
Construction entrepreneurship 720 (KEN 720) - Credits: 8.00
Construction contract law 740 (KKR 740) - Credits: 8.00
Construction project management 730 (KPB 730) - Credits: 8.00
Construction quantities 700 (KSH 700) - Credits: 20.00
Research methodology 710 (NNM 710) - Credits: 4.00

BScHons Engineering and Technology Management (12241073)

Minimum duration of study 1 year

Programme information

The BScHons (Engineering and Technology Management) degree is conferred by the following academic department: Engineering and Technology Management.

The stipulations of Faculty Regulations for honours degrees apply mutatis mutandis.

Any specific module is offered on the condition that a minimum number of students are registered for the module, as determined by the relevant head of department and the Dean. Students must consult the relevant head of department in order to compile a meaningful programme, as well as on the syllabi of the modules. The

relevant departmental postgraduate brochures must be consulted.

Admission requirements

- An appropriate bachelor's degree in the natural sciences with an average of at least 65%, calculated on the grades of all the final-year modules failed and passed; or an appropriate BTech degree with a minimum average of 65%, calculated on the grades of all the modules, failed or passed.
- The average of 65% is not applicable if the applicant has already completed an honours degree, or a management development programme with a minimum average of 65%.
- A full first year of Mathematics or an equivalent is required.
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and to decide if the applicant may be admitted.

Examinations and pass requirements

- i. The examination in each module for which a student is registered, takes place during the normal examination period after the conclusion of lectures (i.e. October/November or May/June).
- ii. A student registered for the honours degree must complete his or her studies within two years (full-time), or within three years (part-time) after first registration for the degree: Provided that the Dean, on recommendation of the relevant head of department, may approve a stipulated limited extension of this period.
- iii. A student must obtain at least 50% in an examination for each module where no semester or year mark is required. A module may only be repeated once.
- iv. In modules where semester or year marks are awarded, a minimum examination mark of 40% and a final mark of 50% is required.
- v. No supplementary or special examinations are granted at postgraduate level.

Pass with distinction

A student passes with distinction if he or she obtains a weighted average of at least 75% in the first 128 credits for which he or she has registered (excluding modules which were discontinued timeously). The degree is not awarded with distinction if a student fails any one module (excluding modules which were discontinued timeously). The degree must be completed within the prescribed study period.

Curriculum: Final year

Minimum credits: 128

Core modules

Engineering technology economics 780 (IKN 780) - Credits: 16.00

Technology and innovation management 780 (INV 780) - Credits: 16.00

Project management 780 (IPK 780) - Credits: 16.00

Research project 780 (ISC 780) - Credits: 32.00

Systems thinking and engineering 780 (ISE 780) - Credits: 16.00

Elective modules

Technological entrepreneurship 780 (IEE 780) - Credits: 16.00

Maintenance and asset management 780 (IMC 780) - Credits: 16.00

Operations management 781 (IVV 781) - Credits: 16.00

BScHons Quantity Surveying (12242017)

Minimum duration of study 1 year

Contact Dr DJ Hoffman danie.hoffman@up.ac.za +27 (0)124202551

Programme information

Consult General Regulations G.16 to G.29 and G.54.

A student is required to attend lectures diligently, but in addition the student must complete a compulsory non-credit bearing module (CWE 700) comprising a minimum of 240 hours of temporary employment with a suitable employer in the construction industry/built environment (registered quantity surveyor, contractor, developer, property owner, etc). As proof of the practical experience the student must submit an approved log book signed by the employer.

Admission requirements

A BSc (Quantity Surveying) degree or an equivalent three-year bachelor's degree at NQF level 7 (or NQF level 6 for qualifications obtained before 2009) from an accredited institution. An equivalent qualification is regarded as one that the South African Council for the Quantity Surveying Profession regards as acceptable for registration as a candidate quantity surveyor and for eventual registration as a professional quantity surveyor.

Additional requirements

Selection is based on an applicant's academic record and experience. Applicants may be required to attend an interview and/or write an entrance examination.

Examinations and pass requirements

A minimum semester/year mark of 40% is required in order to be admitted to the examination in a specific module. In addition, all other examination admission requirements, applicable to the relevant module, must have been met. To pass a module a final mark of 50% is required.

Supplementary examinations

No supplementary examinations are granted at postgraduate level.

Special examinations

No special examinations are granted at postgraduate level.

The degree is awarded when all prescribed modules have been passed.

Pass with distinction

The degree is conferred with distinction if students registered for the degree for the first time, complete the degree within the minimum prescribed time and pass all modules with a weighted average of 75%.

Curriculum: Final year

Minimum credits: 126

Core modules

[Building cost estimation 700](#) (BKR 700) - Credits: 20.00

[Quantity surveying practice 700](#) (BRK 700) - Credits: 12.00

[Research report 785](#) (BRK 785) - Credits: 30.00

Practical work experience 700 (CWE 700) - Credits: 0.00
Feasibility studies 710 (EUS 710) - Credits: 8.00
Feasibility studies 720 (EUS 720) - Credits: 8.00
Quantities 700 (HVV 700) - Credits: 20.00
Construction entrepreneurship 720 (KEN 720) - Credits: 8.00
Construction contract law 740 (KKR 740) - Credits: 8.00
Construction project management 730 (KPB 730) - Credits: 8.00
Research methodology 710 (NNM 710) - Credits: 4.00

BScHons Real Estate Retail Property (12242020)

Minimum duration of study 1 year

Contact Miss V Wilkens vita.wilkens@up.ac.za +27 (0)124203599

Programme information

A student is required to attend lectures diligently, but in addition the student must complete a compulsory minimum of 240 hours of temporary employment with a suitable employer in the construction industry/built environment (registered quantity surveyor, contractor, developer, property owner, etc). As proof of the practical experience the student must submit an approved log book signed by the employer.

Also refer to G Regulations G.16 to G.29 and G.54.

Admission requirements

A BSc (Real Estate) degree or an equivalent three-year bachelor's degree at NQF level 7 (or NQF level 6 for qualifications obtained before 2009) from an accredited institution.

Additional requirements

Selection is based on an applicant's academic record and experience. Applicants may be required to attend an interview and/or write an entrance examination.

Examinations and pass requirements

A minimum semester/year mark of 40% is required in order to be admitted to the examination in a specific module. In addition, all other examination admission requirements, applicable to the relevant module, must have been met.

Pass with distinction

The degree is conferred with distinction if students registered for the degree for the first time, complete the degree within the minimum prescribed time and pass all modules with a weighted average of 75% (excluding POU 700).

Curriculum: Final year

Minimum credits: 131

Core modules

Building cost estimation 700 (BKR 700) - Credits: 20.00
Management practice 700 (BTP 700) - Credits: 6.00

Property marketing 710 (EBM 710) - Credits: 6.00
Market and location studies 720 (EBM 720) - Credits: 6.00
Facilities management 710 (EBS 710) - Credits: 6.00
Property valuation 700 (EDW 700) - Credits: 12.00
Research report 785 (EMW 785) - Credits: 30.00
Property development 711 (EOW 711) - Credits: 9.00
Law of lease contracts 720 (HKR 720) - Credits: 6.00
Construction management 710 (KBS 710) - Credits: 10.00
Property investment 720 (PMN 720) - Credits: 6.00
Practical development feasibility 700 (POU 700) - Credits: 2.00

BScHons Real Estate (12242019)

Minimum duration of study 1 year

Contact Miss V Wilkens vita.wilkins@up.ac.za +27 (0)124203599

Programme information

Consult General Regulations G.16 to G.29 and G.54.

A student is required to attend lectures diligently, but in addition the student must complete a compulsory non-credit bearing module (CWE 700) comprising a minimum of 240 hours of temporary employment with a suitable employer in the construction industry/built environment (registered quantity surveyor, contractor, developer, property owner, etc). As proof of the practical experience the student must submit an approved log book signed by the employer.

Admission requirements

A BSc (Real Estate) degree or an equivalent three-year bachelor's degree at NQF level 7 (or NQF level 6 for qualifications obtained before 2009) from an accredited institution. An equivalent qualification is regarded as one that the South African Council for the Property Valuers' Profession regards as acceptable for registration as a candidate property valuer and for eventual registration as a professional property valuer where applicable.

Additional requirements

Selection is based on an applicant's academic record and experience. Applicants may be required to attend an interview and/or write an entrance examination.

Examinations and pass requirements

A minimum semester/year mark of 40% is required in order to be admitted to the examination in a specific module. In addition, all other examination admission requirements, applicable to the relevant module, must have been met. To pass a module a final mark of 50% is required.

Supplementary examinations

No supplementary examinations are granted at postgraduate level.

Special examinations

No special examinations are granted at postgraduate level.

The degree is awarded when all prescribed modules have been passed.

Pass with distinction

The degree is conferred with distinction if students registered for the degree for the first time, complete the degree within the minimum prescribed time and pass all modules with a weighted average of 75%.

Curriculum: Final year

Minimum credits: 126

Core modules

- Practical work experience 700 (CWE 700) - Credits: 0.00
- Property valuation 702 (EDW 702) - Credits: 20.00
- Research report 785 (EMW 785) - Credits: 30.00
- Feasibility studies 720 (EUS 720) - Credits: 8.00
- Real estate 710 (EWS 710) - Credits: 16.00
- Real estate 711 (EWS 711) - Credits: 12.00
- Real estate 720 (EWS 720) - Credits: 12.00
- Construction entrepreneurship 720 (KEN 720) - Credits: 8.00
- Construction contract law 740 (KKR 740) - Credits: 8.00
- Construction project management 730 (KPB 730) - Credits: 8.00
- Research methodology 710 (NNM 710) - Credits: 4.00

Master's

MArch (12252025)

Minimum duration of study 1 year

Contact	Dr N Botes	nico.botes@up.ac.za	+27 (0)124204600
	Prof AAJ Barker	arthur.barker@up.ac.za	+27 (0)124204542

Programme information

By virtue of a dissertation and examination.

Refer to General Regulations G.30 to G.40 and G. 50 to G.54.

Admission requirements

- A BArch Hons degree or an applicable degree in a relevant field (such as urban design, civil engineering, planning, construction, geography, visual arts, sociology, or any other field deemed acceptable by the departmental Postgraduate Committee; or a BArch or equivalent four-year degree at NQF level 8 (or NQF level 7 for qualifications obtained before 2009); or a three-year degree with design as major component at NQF level 7 (NQF level 6 for qualifications obtained before 2009) and successfully completed supplementary modules relevant to the study field at honours (700) level to the equivalent of 180 credits as prescribed by the departmental Postgraduate Committee.
- Only candidates with a minimum average of 60% in the highest year of study will be considered. The departmental Postgraduate Committee reserves the right to decide if the applicant is suitable for postgraduate studies based on the academic transcript and required application documentation. The Department only accepts candidates for whom it is able to provide supervision. The applicant must intend to do research in architecture or urbanism, must determine the research focus area and a potential supervisor and confirm the potential supervisor's availability (see departmental website for research focus areas, potential supervisors, as well as required application documentation and procedures).

Examinations and pass requirements

After a minimum of one year of registration, the student is to submit a dissertation for examination and have an oral examination of the dissertation in the related field of study.

Awarding of the degree

The Master of Architecture degree is conferred on students obtaining a minimum of 50% for both the dissertation and oral examination.

Research information

General Regulation G.39.12 applies.

Pass with distinction

The Master of Architecture degree is conferred with distinction on students obtaining a minimum of 75% for both the dissertation and the oral examination.

Curriculum: Final year

Core modules

Dissertation: Architecture 890 (ARG 890) - Credits: 180.00

MArch (Professional) (12252026)

Minimum duration of study 1 year

Contact	Dr N Botes	nico.botes@up.ac.za	+27 (0)124204600
	Prof AAJ Barker	arthur.barker@up.ac.za	+27 (0)124204542

Programme information

The Master of Architecture (Professional) is a taught master's degree for the purposes of registration as a candidate professional architect with the South African Council for the Architectural Profession in terms of Act 44 of 2000 and is done by coursework, projects and a design investigation mini-dissertation and design project and discourse.

Admission requirements

- A BArch Hons degree; or an equivalent degree that includes spatial design at NQF level 8 (or NQF level 7 for qualifications obtained before 2009). The departmental Postgraduate Committee may require an evaluation in fields of knowledge and registration for additional modules for non-degree purposes.
- An applicant who has completed a BArch Hons degree at the University of Pretoria with a minimum average of 60% for all modules in the honours curriculum (completed in the same academic year) will be granted admission to this degree.
- All other applicants must have practical experience and/or a record of an extended study excursion, submit a portfolio and design journal, and are interviewed for selection.
- A limited number of applicants are admitted to this degree. Refer to the departmental website for guidelines.

Additional requirements

Also refer to General Regulations G.30 to G.40 and G. 50 to G.54.

Other programme-specific information

Design topic

The topic of the final design project (DIT 801 & DPD 801) must be approved by the relevant head of department.

Awarding of degree

The degree is awarded to those students who have obtained the prescribed credits. Those students admitted with conditions must comply with all of these before all the 700 series module credits and the degree are awarded.

Examinations and pass requirements

The minimum pass mark is 50%. A minimum of 40% is required in the examination, with a minimum final mark of 50% to pass. If a module is not evaluated by examination a minimum coursework mark of 50% is required. If the module is not evaluated by coursework a minimum examination mark of 50% is required.

Research information

General Regulation G.39.12 applies.

Pass with distinction

The degree is conferred with distinction on those students registering for the first time and obtaining a distinction (75%) simultaneously for both the Design investigation mini-dissertation (DIT 801) and the Design project and discourse (DPD 801) with the proviso that the degree is completed within the minimum prescribed time and all other final-year modules are passed on first registration.

Curriculum: Final year

Core modules

Continuing practice development 810 (CPD 810) - Credits: 15.00

Design investigation 801 (DIT 801) - Credits: 75.00

Mini-dissertation: Design project and discourse 801 (DPD 801) - Credits: 90.00

MEng Bioengineering (12250203)

Minimum duration of study 1 year

Programme information

- Unless the Dean, on recommendation of the relevant head of department, decides otherwise, the master's degree is conferred on the basis of a dissertation (including, where applicable, an examination on the dissertation).
- A minimum of 128 credits is required to obtain the MEng degree.
- Recognition is not granted for credits acquired during studying for the BEngHons or the BSchHons.
- The various departmental postgraduate brochures should also be consulted.

Admission requirements

- A BEng Hons degree awarded by the University of Pretoria, or an equivalent qualification. The applicant must have passed this degree with a weighted average of at least 65%.
- The applicant must also meet the admission requirements for the BEng Hons degree.
- The departmental Postgraduate Committee may require additional honours modules for non-degree purposes where background is insufficient.
- The departmental Postgraduate Committee may request evidence of knowledge of research methodology.
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.
- The applicant must determine the research group/focus area and a potential supervisor and confirm the potential supervisor's availability (see departmental website for research groups and heads of research groups). Admission will be granted only if the intended research fits in with the research foci of the Department and the supervision capacity exists, as decided by the Head of the Department.

Examinations and pass requirements

The stipulations of the relevant Faculty regulations are applicable.

The Dean may, on recommendation of the relevant head of department, exempt a student from the examination on the dissertation.

The average mark awarded by all the examiners is the final mark, with the pass mark being at least 50%.

Research information

A student must by means of a dissertation prove that he or she is capable of planning, instituting and executing a scientific investigation. Unless the Senate, on the recommendation of the supervisor, decides otherwise, a student, before or on submission of a dissertation, must submit proof issued by a recognised academic journal that an article was submitted, to the Head: Student Administration. The draft article should be based on the research that the student has conducted for the dissertation and be approved by the supervisor if the supervisor is not a co-author. The supervisor shall be responsible for ensuring that the paper is taken through all the processes of revision and resubmission, as may be necessary. Conferment of the degree may be made subject to compliance with the stipulations of this regulation.

Pass with distinction

A student passes with distinction if an average mark of at least 75% is obtained for the dissertation (and the examination on the dissertation, where applicable).

Curriculum: Final year

Core modules

Dissertation: Bioengineering 890 (EIB 890) - Credits: 180.00

MEng Chemical Engineering (12250022)

Minimum duration of study 1 year

Programme information

- Unless the Dean, on recommendation of the relevant head of department, decides otherwise, the master's degree is conferred on the basis of a dissertation (including, where applicable, an examination on the dissertation).
- A minimum of 128 credits is required to obtain the MEng degree.
- Recognition is not granted for credits acquired during studying for the BEngHons or the BSchHons.
- The various departmental postgraduate brochures should also be consulted.

Admission requirements

- A BEng Hons degree awarded by the University of Pretoria, or an equivalent qualification. The applicant must have passed this degree with a weighted average of at least 65%.
- The applicant must also meet the admission requirements for the BEng Hons degree.
- The departmental Postgraduate Committee may require additional honours modules for non-degree purposes where background is insufficient.
- The departmental Postgraduate Committee may request evidence of knowledge of research methodology.
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.
- The applicant must determine the research group/focus area and a potential supervisor and confirm the

potential supervisor's availability (see departmental website for research groups and heads of research groups). Admission will be granted only if the intended research fits in with the research foci of the Department and the supervision capacity exists, as decided by the Head of the Department.

Examinations and pass requirements

The stipulations of the relevant Faculty regulations are applicable.

The Dean may, on recommendation of the relevant head of department, exempt a student from the examination on the dissertation.

The average mark awarded by all the examiners is the final mark, with the pass mark being at least 50%.

Research information

A student must by means of a dissertation prove that he or she is capable of planning, instituting and executing a scientific investigation. Unless the Senate, on the recommendation of the supervisor, decides otherwise, a student, before or on submission of a dissertation, must submit proof issued by a recognised academic journal that an article was submitted, to the Head: Student Administration. The draft article should be based on the research that the student has conducted for the dissertation and be approved by the supervisor if the supervisor is not a co-author. The supervisor shall be responsible for ensuring that the paper is taken through all the processes of revision and resubmission, as may be necessary. Conferment of the degree may be made subject to compliance with the stipulations of this regulation.

Pass with distinction

A student passes with distinction if an average mark of at least 75% is obtained for the dissertation (and the examination on the dissertation, where applicable).

Curriculum: Final year

Core modules

Dissertation 800 (CVD 800) - Credits: 180.00

MEng Computer Engineering (12250214)

Minimum duration of study 1 year

Programme information

- Unless the Dean, on recommendation of the relevant head of department, decides otherwise, the master's degree is conferred on the basis of a dissertation (including, where applicable, an examination on the dissertation).
- A minimum of 128 credits is required to obtain the MEng degree.
- Recognition is not granted for credits acquired during studying for the BEngHons or the BSchHons.
- The various departmental postgraduate brochures should also be consulted.

Admission requirements

- A BEng Hons degree awarded by the University of Pretoria, or an equivalent qualification. The applicant must have passed this degree with a weighted average of at least 65%.
- The applicant must also meet the admission requirements for the BEng Hons degree.

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- The departmental Postgraduate Committee may require additional honours modules for non-degree purposes where background is insufficient.
 - The departmental Postgraduate Committee may request evidence of knowledge of research methodology.
 - The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.
 - The applicant must determine the research group/focus area and a potential supervisor and confirm the potential supervisor's availability (see departmental website for research groups and heads of research groups). Admission will be granted only if the intended research fits in with the research foci of the Department and the supervision capacity exists, as decided by the Head of the Department.

Examinations and pass requirements

The stipulations of the relevant Faculty regulations are applicable.

The Dean may, on recommendation of the relevant head of department, exempt a student from the examination on the dissertation.

The average mark awarded by all the examiners is the final mark, with the pass mark being at least 50%.

Research information

A student must by means of a dissertation prove that he or she is capable of planning, instituting and executing a scientific investigation. Unless the Senate, on the recommendation of the supervisor, decides otherwise, a student, before or on submission of a dissertation, must submit proof issued by a recognised academic journal that an article was submitted, to the Head: Student Administration. The draft article should be based on the research that the student has conducted for the dissertation and be approved by the supervisor if the supervisor is not a co-author. The supervisor shall be responsible for ensuring that the paper is taken through all the processes of revision and resubmission, as may be necessary. Conferment of the degree may be made subject to compliance with the stipulations of this regulation.

Pass with distinction

A student passes with distinction if an average mark of at least 75% is obtained for the dissertation (and the examination on the dissertation, where applicable).

Curriculum: Final year

Core modules

Dissertation: [Computer engineering 890](#) (ERI 890) - Credits: 180.00

MEng Control Engineering (12250232)

Minimum duration of study 1 year

Programme information

- Unless the Dean, on recommendation of the relevant head of department, decides otherwise, the master's degree is conferred on the basis of a dissertation (including, where applicable, an examination on the dissertation).

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- A minimum of 128 credits is required to obtain the MEng degree.
 - Recognition is not granted for credits acquired during studying for the BEngHons or the BSchHons.
 - The various departmental postgraduate brochures should also be consulted.

Admission requirements

- A BEng Hons degree awarded by the University of Pretoria, or an equivalent qualification. The applicant must have passed this degree with a weighted average of at least 65%.
- The applicant must also meet the admission requirements for the BEng Hons degree.
- The departmental Postgraduate Committee may require additional honours modules for non-degree purposes where background is insufficient.
- The departmental Postgraduate Committee may request evidence of knowledge of research methodology.
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.
- The applicant must determine the research group/focus area and a potential supervisor and confirm the potential supervisor's availability (see departmental website for research groups and heads of research groups). Admission will be granted only if the intended research fits in with the research foci of the Department and the supervision capacity exists, as decided by the Head of the Department.

Examinations and pass requirements

The stipulations of the relevant Faculty regulations are applicable.

The Dean may, on recommendation of the relevant head of department, exempt a student from the examination on the dissertation.

The average mark awarded by all the examiners is the final mark, with the pass mark being at least 50%.

Research information

A student must by means of a dissertation prove that he or she is capable of planning, instituting and executing a scientific investigation. Unless the Senate, on the recommendation of the supervisor, decides otherwise, a student, before or on submission of a dissertation, must submit proof issued by a recognised academic journal that an article was submitted, to the Head: Student Administration. The draft article should be based on the research that the student has conducted for the dissertation and be approved by the supervisor if the supervisor is not a co-author. The supervisor shall be responsible for ensuring that the paper is taken through all the processes of revision and resubmission, as may be necessary. Conferment of the degree may be made subject to compliance with the stipulations of this regulation.

Pass with distinction

A student passes with distinction if an average mark of at least 75% is obtained for the dissertation (and the examination on the dissertation, where applicable).

Curriculum: Final year

Core modules

Dissertation 800 (CVD 800) - Credits: 180.00

MEng Electrical Engineering (12250032)

Minimum duration of study 1 year

Programme information

- Unless the Dean, on recommendation of the relevant head of department, decides otherwise, the master's degree is conferred on the basis of a dissertation (including, where applicable, an examination on the dissertation).
- A minimum of 128 credits is required to obtain the MEng degree.
- Recognition is not granted for credits acquired during studying for the BEngHons or the BScHons.
- The various departmental postgraduate brochures should also be consulted.

Admission requirements

- A BEng Hons degree awarded by the University of Pretoria, or an equivalent qualification. The applicant must have passed this degree with a weighted average of at least 65%.
- The applicant must also meet the admission requirements for the BEng Hons degree.
- The departmental Postgraduate Committee may require additional honours modules for non-degree purposes where background is insufficient.
- The departmental Postgraduate Committee may request evidence of knowledge of research methodology.
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.
- The applicant must determine the research group/focus area and a potential supervisor and confirm the potential supervisor's availability (see departmental website for research groups and heads of research groups). Admission will be granted only if the intended research fits in with the research foci of the Department and the supervision capacity exists, as decided by the Head of the Department.

Examinations and pass requirements

The stipulations of the relevant Faculty regulations are applicable.

The Dean may, on recommendation of the relevant head of department, exempt a student from the examination on the dissertation.

The average mark awarded by all the examiners is the final mark, with the pass mark being at least 50%.

Research information

A student must by means of a dissertation prove that he or she is capable of planning, instituting and executing a scientific investigation. Unless the Senate, on the recommendation of the supervisor, decides otherwise, a student, before or on submission of a dissertation, must submit proof issued by a recognised academic journal that an article was submitted, to the Head: Student Administration. The draft article should be based on the research that the student has conducted for the dissertation and be approved by the supervisor if the supervisor is not a co-author. The supervisor shall be responsible for ensuring that the paper is taken through all the processes of revision and resubmission, as may be necessary. Conferment of the degree may be made subject to compliance with the stipulations of this regulation.

Pass with distinction

A student passes with distinction if an average mark of at least 75% is obtained for the dissertation (and the examination on the dissertation, where applicable).

Curriculum: Final year

Core modules

Dissertation: Electrical engineering 890 (EIR 890) - Credits: 180.00

MEng Electronic Engineering (12250094)

Minimum duration of study 1 year

Programme information

- Unless the Dean, on recommendation of the relevant head of department, decides otherwise, the master's degree is conferred on the basis of a dissertation (including, where applicable, an examination on the dissertation).
- A minimum of 128 credits is required to obtain the MEng degree.
- Recognition is not granted for credits acquired during studying for the BEngHons or the BScHons.
- The various departmental postgraduate brochures should also be consulted.

Admission requirements

- A BEng Hons degree awarded by the University of Pretoria, or an equivalent qualification. The applicant must have passed this degree with a weighted average of at least 65%.
- The applicant must also meet the admission requirements for the BEng Hons degree.
- The departmental Postgraduate Committee may require additional honours modules for non-degree purposes where background is insufficient.
- The departmental Postgraduate Committee may request evidence of knowledge of research methodology.
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.
- The applicant must determine the research group/focus area and a potential supervisor and confirm the potential supervisor's availability (see departmental website for research groups and heads of research groups). Admission will be granted only if the intended research fits in with the research foci of the Department and the supervision capacity exists, as decided by the Head of the Department.

Examinations and pass requirements

The stipulations of the relevant Faculty regulations are applicable.

The Dean may, on recommendation of the relevant head of department, exempt a student from the examination on the dissertation.

The average mark awarded by all the examiners is the final mark, with the pass mark being at least 50%.

Research information

A student must by means of a dissertation prove that he or she is capable of planning, instituting and executing a scientific investigation. Unless the Senate, on the recommendation of the supervisor, decides otherwise, a

student, before or on submission of a dissertation, must submit proof issued by a recognised academic journal that an article was submitted, to the Head: Student Administration. The draft article should be based on the research that the student has conducted for the dissertation and be approved by the supervisor if the supervisor is not a co-author. The supervisor shall be responsible for ensuring that the paper is taken through all the processes of revision and resubmission, as may be necessary. Conferment of the degree may be made subject to compliance with the stipulations of this regulation.

Pass with distinction

A student passes with distinction if an average mark of at least 75% is obtained for the dissertation (and the examination on the dissertation, where applicable).

Curriculum: Final year

Core modules

Dissertation: Electronic engineering 890 (EIN 890) - Credits: 180.00

MEng Engineering Management (Coursework) (12250173)

Minimum duration of study 2 years

Programme information

- Unless the Dean, on recommendation of the relevant head of department, decides otherwise, the master's degree is conferred on the basis of examinations of coursework and a mini-dissertation (including an examination on the mini-dissertation).
- A minimum of 180 credits is required to obtain the MEng degree. A mini-dissertation (90 credits) and coursework (90 credits) is included in the programme.
- Recognition is not granted for credits acquired during studying for the BEngHons or the BScHons.
- The curriculum is determined in consultation with the relevant head of department. Any specific module is offered on condition that a minimum number of students are registered for the module, as determined by the relevant head of department and the Dean. Students must consult the relevant head of department in order to compile a meaningful programme, as well as for information on the syllabi of the modules. The various departmental postgraduate brochures should also be consulted.

Admission requirements

- A four-year bachelor's degree in Engineering from a recognised institution.
- Three years of relevant post-graduate work experience.
- The Department has limited supervisory capacity and only accepts applicants for whom supervision can be provided. The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and work experience and to decide if the applicant is suitable for postgraduate studies. Based on this, the three years of work experience may be waived.

Examinations and pass requirements

The stipulations of the relevant Faculty regulations are applicable.

Guidelines for the preparation and examination of mini-dissertations are available from the department.

- i. The examination in each module for which a student is registered, takes place during the normal examination period after the conclusion of lectures (i.e. October/November or May/June).

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- ii. A student registered for the masters degree must complete his or her studies within three years provided that the Dean, on recommendation of the relevant head of department, may approve a stipulated limited extension of this period.
 - iii. A student must obtain at least 50% in an examination for each module where no semester or year mark is required. A module may only be repeated once.
 - iv. In modules where semester or year marks are awarded, a minimum examination mark of 40% and a final mark of 50% is required.
 - v. No supplementary or special examinations are granted at postgraduate level.

Research information

A student must by means of a mini-dissertation prove that he or she is capable of planning, instituting and executing a scientific investigation. As part of the examination a student must submit an article and present at the final year symposium. The article should be based on the research that the student has conducted for the dissertation and be approved by the supervisor. Conferment of the degree may be made subject to compliance with the stipulations of this regulation.

Pass with distinction

A student who completes the master's degree on grounds of coursework and a mini-dissertation, passes with distinction if a weighted average mark of at least 75% is obtained in the first 180 credits obtained for the degree provided that 90 of these credits are allocated to the mini-dissertation. However, the degree is not awarded with distinction should a student fail any of these modules (excluding modules which have been timeously discontinued). The degree is also not awarded with distinction if a student obtains less than 70% for the mini-dissertation. The degree must be completed within the prescribed study period.

Curriculum: Year 1

Core modules

Engineering asset management and maintenance 801 (IAM 801) - Credits: 10.00

Mini-dissertation 899 (IGB 899) - Credits: 90.00

Production and operations management 801 (IPP 801) - Credits: 10.00

Systems engineering and management 801 (ISE 801) - Credits: 10.00

Strategic management 801 (ISM 801) - Credits: 10.00

Technology management 801 (ITB 801) - Credits: 10.00

People management 883 (PEM 883) - Credits: 10.00

Curriculum: Final year

Core modules

Financial management 830 (FBS 830) - Credits: 10.00

Mini-dissertation 899 (IGB 899) - Credits: 90.00

Elective modules

Systems thinking 801 (IBI 801) - Credits: 10.00

Industrial marketing 801 (IIM 801) - Credits: 10.00

Commercialisation and intellectual property 881 (IKG 881) - Credits: 10.00

Quality management 801 (IKK 801) - Credits: 10.00

Knowledge and information management 884 (ILB 884) - Credits: 10.00

Legal aspects 803 (ILC 803) - Credits: 10.00
Sustainability 802 (ILE 802) - Credits: 10.00
Project planning 802 (IMP 802) - Credits: 10.00
New product development 880 (INP 880) - Credits: 10.00
New ventures and entrepreneurship 801 (IOE 801) - Credits: 10.00
Programme and portfolio management 802 (IPM 802) - Credits: 10.00
Risk management 801 (IRI 801) - Credits: 10.00

MEng Environmental Engineering (12250222)

Minimum duration of study 1 year

Programme information

- Unless the Dean, on recommendation of the relevant head of department, decides otherwise, the master's degree is conferred on the basis of a dissertation (including, where applicable, an examination on the dissertation).
- A minimum of 128 credits is required to obtain the MEng degree.
- Recognition is not granted for credits acquired during studying for the BEngHons or the BScHons.
- The various departmental postgraduate brochures should also be consulted.

Admission requirements

- A BEng Hons degree awarded by the University of Pretoria, or an equivalent qualification. The applicant must have passed this degree with a weighted average of at least 65%.
- The applicant must also meet the admission requirements for the BEng Hons degree.
- The departmental Postgraduate Committee may require additional honours modules for non-degree purposes where background is insufficient.
- The departmental Postgraduate Committee may request evidence of knowledge of research methodology.
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.
- The applicant must determine the research group/focus area and a potential supervisor and confirm the potential supervisor's availability (see departmental website for research groups and heads of research groups). Admission will be granted only if the intended research fits in with the research foci of the Department and the supervision capacity exists, as decided by the Head of the Department.

Examinations and pass requirements

The stipulations of the relevant Faculty regulations are applicable.

The Dean may, on recommendation of the relevant head of department, exempt a student from the examination on the dissertation.

The average mark awarded by all the examiners is the final mark, with the pass mark being at least 50%.

Research information

A student must by means of a dissertation prove that he or she is capable of planning, instituting and executing a scientific investigation. Unless the Senate, on the recommendation of the supervisor, decides otherwise, a

student, before or on submission of a dissertation, must submit proof issued by a recognised academic journal that an article was submitted, to the Head: Student Administration. The draft article should be based on the research that the student has conducted for the dissertation and be approved by the supervisor if the supervisor is not a co-author. The supervisor shall be responsible for ensuring that the paper is taken through all the processes of revision and resubmission, as may be necessary. Conferment of the degree may be made subject to compliance with the stipulations of this regulation.

Pass with distinction

A student passes with distinction if an average mark of at least 75% is obtained for the dissertation (and the examination on the dissertation, where applicable).

Curriculum: Final year

Core modules

Dissertation 800 (CVD 800) - Credits: 180.00

MEng Geotechnical Engineering (12250215)

Minimum duration of study 1 year

Programme information

- Unless the Dean, on recommendation of the relevant head of department, decides otherwise, the master's degree is conferred on the basis of a dissertation (including, where applicable, an examination on the dissertation).
- A minimum of 128 credits is required to obtain the MEng degree.
- Recognition is not granted for credits acquired during studying for the BEngHons or the BSchHons.
- The various departmental postgraduate brochures should also be consulted.

Admission requirements

- A BEng Hons degree awarded by the University of Pretoria, or an equivalent qualification. The applicant must have passed this degree with a weighted average of at least 65%.
- The applicant must also meet the admission requirements for the BEng Hons degree.
- The departmental Postgraduate Committee may require additional honours modules for non-degree purposes where background is insufficient.
- The departmental Postgraduate Committee may request evidence of knowledge of research methodology.
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.
- The applicant must determine the research group/focus area and a potential supervisor and confirm the potential supervisor's availability (see departmental website for research groups and heads of research groups). Admission will be granted only if the intended research fits in with the research foci of the Department and the supervision capacity exists, as decided by the Head of the Department.

Examinations and pass requirements

The stipulations of the relevant Faculty regulations are applicable.

The Dean may, on recommendation of the relevant head of department, exempt a student from the examination

on the dissertation.

The average mark awarded by all the examiners is the final mark, with the pass mark being at least 50%.

Research information

A student must by means of a dissertation prove that he or she is capable of planning, instituting and executing a scientific investigation. Unless the Senate, on the recommendation of the supervisor, decides otherwise, a student, before or on submission of a dissertation, must submit proof issued by a recognised academic journal that an article was submitted, to the Head: Student Administration. The draft article should be based on the research that the student has conducted for the dissertation and be approved by the supervisor if the supervisor is not a co-author. The supervisor shall be responsible for ensuring that the paper is taken through all the processes of revision and resubmission, as may be necessary. Conferment of the degree may be made subject to compliance with the stipulations of this regulation.

Pass with distinction

A student passes with distinction if an average mark of at least 75% is obtained for the dissertation (and the examination on the dissertation, where applicable).

Curriculum: Final year

Core modules

Dissertation 890 (SGI 890) - Credits: 180.00

MEng Industrial Engineering (12250012)

Minimum duration of study 1 year

Programme information

The master's degree is conferred on the basis of a dissertation (180 credits).

Admission requirements

- A BEng Hons degree awarded by the University of Pretoria, or an equivalent qualification. The applicant must have passed this degree with a weighted average of at least 65%.
- The applicant must also meet the admission requirements for the BEng Hons degree.
- The departmental Postgraduate Committee may require additional honours modules for non-degree purposes where background is insufficient.
- The departmental Postgraduate Committee may request evidence of knowledge of research methodology.
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.
- The applicant must determine the research group/focus area and a potential supervisor and confirm the potential supervisor's availability (see departmental website for research groups and heads of research groups). Admission will be granted only if the intended research fits in with the research foci of the Department and the supervision capacity exists, as decided by the Head of the Department.

Other programme-specific information

Please refer to the Programme Guide for further information, available [here](#).

Examinations and pass requirements

The stipulations of the relevant Faculty regulations are applicable.

The average mark awarded by all the examiners is the final mark, with the pass mark being at least 50%.

Research information

A student must by means of a dissertation prove that he or she is capable of planning, instituting and executing a scientific investigation. Unless the Senate, on the recommendation of the supervisor, decides otherwise, a student, before or on submission of a dissertation, must submit proof issued by a recognised academic journal that an article was submitted, to the Head: Student Administration. The draft article should be based on the research that the student has conducted for the dissertation and be approved by the supervisor if the supervisor is not a co-author. The supervisor shall be responsible for ensuring that the paper is taken through all the processes of revision and resubmission, as may be necessary. Conferment of the degree may be made subject to compliance with the stipulations of this regulation.

Pass with distinction

A student passes with distinction if an average mark of at least 75% is obtained for the dissertation (and the examination on the dissertation, where applicable).

Curriculum: Final year

Core modules

Dissertation: Industrial engineering 890 (BIR 890) - Credits: 180.00

MEng Mechanical Engineering (12250052)

Minimum duration of study 1 year

Programme information

- Unless the Dean, on recommendation of the relevant head of department, decides otherwise, the master's degree is conferred on the basis of a dissertation (including, where applicable, an examination on the dissertation).
- A minimum of 128 credits is required to obtain the MEng degree.
- Recognition is not granted for credits acquired during studying for the BEngHons or the BScHons.
- The various departmental postgraduate brochures should also be consulted.

Admission requirements

- A BEng Hons degree awarded by the University of Pretoria, or an equivalent qualification. The applicant must have passed this degree with a weighted average of at least 65%.
- The applicant must also meet the admission requirements for the BEng Hons degree.
- The departmental Postgraduate Committee may require additional honours modules for non-degree purposes where background is insufficient.
- The departmental Postgraduate Committee may request evidence of knowledge of research methodology.
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.
- The applicant must determine the research group/focus area and a potential supervisor and confirm the

potential supervisor's availability (see departmental website for research groups and heads of research groups). Admission will be granted only if the intended research fits in with the research foci of the Department and the supervision capacity exists, as decided by the Head of the Department.

Examinations and pass requirements

The stipulations of the relevant Faculty regulations are applicable.

The Dean may, on recommendation of the relevant head of department, exempt a student from the examination on the dissertation.

The average mark awarded by all the examiners is the final mark, with the pass mark being at least 50%.

Research information

A student must by means of a dissertation prove that he or she is capable of planning, instituting and executing a scientific investigation. Unless the Senate, on the recommendation of the supervisor, decides otherwise, a student, before or on submission of a dissertation, must submit proof issued by a recognised academic journal that an article was submitted, to the Head: Student Administration. The draft article should be based on the research that the student has conducted for the dissertation and be approved by the supervisor if the supervisor is not a co-author. The supervisor shall be responsible for ensuring that the paper is taken through all the processes of revision and resubmission, as may be necessary. Conferment of the degree may be made subject to compliance with the stipulations of this regulation.

Pass with distinction

A student passes with distinction if an average mark of at least 75% is obtained for the dissertation (and the examination on the dissertation, where applicable).

Curriculum: Final year

Core modules

Dissertation: Mechanical engineering 890 (MIR 890) - Credits: 180.00

MEng Metallurgical Engineering (12250062)

Minimum duration of study 1 year

Programme information

- Unless the Dean, on recommendation of the relevant head of department, decides otherwise, the master's degree is conferred on the basis of a dissertation (including, where applicable, an examination on the dissertation).
- A minimum of 128 credits is required to obtain the MEng degree.
- Recognition is not granted for credits acquired during studying for the BEngHons or the BSchHons.
- The various departmental postgraduate brochures should also be consulted.

Admission requirements

- A BEng Hons degree awarded by the University of Pretoria, or an equivalent qualification. The applicant must have passed this degree with a weighted average of at least 65%.

- The applicant must also meet the admission requirements for the BEng Hons degree.
- The departmental Postgraduate Committee may require additional honours modules for non-degree purposes where background is insufficient.
- The departmental Postgraduate Committee may request evidence of knowledge of research methodology.
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.
- The applicant must determine the research group/focus area and a potential supervisor and confirm the potential supervisor's availability (see departmental website for research groups and heads of research groups). Admission will be granted only if the intended research fits in with the research foci of the Department and the supervision capacity exists, as decided by the Head of the Department.

Examinations and pass requirements

The stipulations of the relevant Faculty regulations are applicable.

The Dean may, on recommendation of the relevant head of department, exempt a student from the examination on the dissertation.

The average mark awarded by all the examiners is the final mark, with the pass mark being at least 50%.

Research information

A student must by means of a dissertation prove that he or she is capable of planning, instituting and executing a scientific investigation. Unless the Senate, on the recommendation of the supervisor, decides otherwise, a student, before or on submission of a dissertation, must submit proof issued by a recognised academic journal that an article was submitted, to the Head: Student Administration. The draft article should be based on the research that the student has conducted for the dissertation and be approved by the supervisor if the supervisor is not a co-author. The supervisor shall be responsible for ensuring that the paper is taken through all the processes of revision and resubmission, as may be necessary. Conferment of the degree may be made subject to compliance with the stipulations of this regulation.

Pass with distinction

A student passes with distinction if an average mark of at least 75% is obtained for the dissertation (and the examination on the dissertation, where applicable).

Curriculum: Final year

Core modules

Dissertation 890 (NIN 890) - Credits: 180.00

MEng Microelectronic Engineering (12250192)

Minimum duration of study 1 year

Programme information

- Unless the Dean, on recommendation of the relevant head of department, decides otherwise, the master's degree is conferred on the basis of a dissertation (including, where applicable, an examination on the dissertation).

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- A minimum of 128 credits is required to obtain the MEng degree.
 - Recognition is not granted for credits acquired during studying for the BEngHons or the BSchHons.
 - The various departmental postgraduate brochures should also be consulted.

Admission requirements

- A BEng Hons degree awarded by the University of Pretoria, or an equivalent qualification. The applicant must have passed this degree with a weighted average of at least 65%.
- The applicant must also meet the admission requirements for the BEng Hons degree.
- The departmental Postgraduate Committee may require additional honours modules for non-degree purposes where background is insufficient.
- The departmental Postgraduate Committee may request evidence of knowledge of research methodology.
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.
- The applicant must determine the research group/focus area and a potential supervisor and confirm the potential supervisor's availability (see departmental website for research groups and heads of research groups). Admission will be granted only if the intended research fits in with the research foci of the Department and the supervision capacity exists, as decided by the Head of the Department.

Examinations and pass requirements

The stipulations of the relevant Faculty regulations are applicable.

The Dean may, on recommendation of the relevant head of department, exempt a student from the examination on the dissertation.

The average mark awarded by all the examiners is the final mark, with the pass mark being at least 50%.

Research information

A student must by means of a dissertation prove that he or she is capable of planning, instituting and executing a scientific investigation. Unless the Senate, on the recommendation of the supervisor, decides otherwise, a student, before or on submission of a dissertation, must submit proof issued by a recognised academic journal that an article was submitted, to the Head: Student Administration. The draft article should be based on the research that the student has conducted for the dissertation and be approved by the supervisor if the supervisor is not a co-author. The supervisor shall be responsible for ensuring that the paper is taken through all the processes of revision and resubmission, as may be necessary. Conferment of the degree may be made subject to compliance with the stipulations of this regulation.

Pass with distinction

A student passes with distinction if an average mark of at least 75% is obtained for the dissertation (and the examination on the dissertation, where applicable).

Curriculum: Final year

Core modules

Dissertation: Micro-electronic engineering 890 (EEY 890) - Credits: 180.00

MEng Mining Engineering (12250072)

Minimum duration of study 1 year

Programme information

- Unless the Dean, on recommendation of the relevant head of department, decides otherwise, the master's degree is conferred on the basis of a dissertation (including, where applicable, an examination on the dissertation).
- A minimum of 128 credits is required to obtain the MEng degree.
- Recognition is not granted for credits acquired during studying for the BEngHons or the BScHons.
- The various departmental postgraduate brochures should also be consulted.

Admission requirements

- A BEng Hons degree awarded by the University of Pretoria, or an equivalent qualification. The applicant must have passed this degree with a weighted average of at least 65%.
- The applicant must also meet the admission requirements for the BEng Hons degree.
- The departmental Postgraduate Committee may require additional honours modules for non-degree purposes where background is insufficient.
- The departmental Postgraduate Committee may request evidence of knowledge of research methodology.
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.
- The applicant must determine the research group/focus area and a potential supervisor and confirm the potential supervisor's availability (see departmental website for research groups and heads of research groups). Admission will be granted only if the intended research fits in with the research foci of the Department and the supervision capacity exists, as decided by the Head of the Department.

Examinations and pass requirements

The stipulations of the relevant Faculty regulations are applicable.

The Dean may, on recommendation of the relevant head of department, exempt a student from the examination on the dissertation.

The average mark awarded by all the examiners is the final mark, with the pass mark being at least 50%.

Research information

A student must by means of a dissertation prove that he or she is capable of planning, instituting and executing a scientific investigation. Unless the Senate, on the recommendation of the supervisor, decides otherwise, a student, before or on submission of a dissertation, must submit proof issued by a recognised academic journal that an article was submitted, to the Head: Student Administration. The draft article should be based on the research that the student has conducted for the dissertation and be approved by the supervisor if the supervisor is not a co-author. The supervisor shall be responsible for ensuring that the paper is taken through all the processes of revision and resubmission, as may be necessary. Conferment of the degree may be made subject to compliance with the stipulations of this regulation.

Pass with distinction

A student passes with distinction if an average mark of at least 75% is obtained for the dissertation (and the examination on the dissertation, where applicable).

Curriculum: Final year

Core modules

Dissertation: Mining engineering 890 (PYI 890) - Credits: 180.00

MEng Project Management (Coursework) (12250263)

Minimum duration of study 2 years

Programme information

- Unless the Dean, on recommendation of the relevant head of department, decides otherwise, the master's degree is conferred on the basis of examinations of coursework and a mini-dissertation (including an examination on the mini-dissertation).
- A minimum of 180 credits is required to obtain the MEng degree. A mini-dissertation (90 credits) and coursework (90 credits) is included in the programme.
- Recognition is not granted for credits acquired during studying for the BEngHons or the BScHons.
- The curriculum is determined in consultation with the relevant head of department. Any specific module is offered on condition that a minimum number of students are registered for the module, as determined by the relevant head of department and the Dean. Students must consult the relevant head of department in order to compile a meaningful programme, as well as for information on the syllabi of the modules. The various departmental postgraduate brochures should also be consulted.

Admission requirements

A four-year bachelor's degree in Engineering from a recognised institution.

- Three years of relevant post-graduate work experience.
- The Department has limited supervisory capacity and only accepts applicants for whom supervision can be provided. The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and work experience and to decide if the applicant is suitable for postgraduate studies. Based on this, the three years of work experience may be waived.

Other programme-specific information

Details regarding the curricula as well as syllabi of the respective domains are available from the Department.

Examinations and pass requirements

The stipulations of the relevant Faculty regulations are applicable.

Guidelines for the preparation and examination of mini-dissertations are available from the department.

- i. The examination in each module for which a student is registered, takes place during the normal examination period after the conclusion of lectures (i.e. October/November or May/June).
- ii. A student registered for the masters degree must complete his or her studies within three years provided that the Dean, on recommendation of the relevant head of department, may approve a stipulated limited extension of this period.
- iii. A student must obtain at least 50% in an examination for each module where no semester or year mark is required. A module may only be repeated once.

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- iv. In modules where semester or year marks are awarded, a minimum examination mark of 40% and a final mark of 50% is required.
 - v. No supplementary or special examinations are granted at postgraduate level.

Research information

A student must by means of a mini-dissertation prove that he or she is capable of planning, instituting and executing a scientific investigation. As part of the examination a student must submit an article and present at the final year symposium. The article should be based on the research that the student has conducted for the dissertation and be approved by the supervisor. Conferment of the degree may be made subject to compliance with the stipulations of this regulation.

Pass with distinction

A student who completes the master's degree on grounds of coursework and a mini-dissertation, passes with distinction if a weighted average mark of at least 75% is obtained in the first 180 credits obtained for the degree provided that 90 of these credits are allocated to the mini-dissertation. However, the degree is not awarded with distinction should a student fail any of these modules (excluding modules which have been timeously discontinued). The degree is also not awarded with distinction if a student obtains less than 70% for the mini-dissertation. The degree must be completed within the prescribed study period.

Curriculum: Year 1

Core modules

Mini-dissertation 899 (IGB 899) - Credits: 90.00
Project organisation 801 (IHR 801) - Credits: 10.00
Project planning 802 (IMP 802) - Credits: 10.00
Finance and cost management 802 (IPF 802) - Credits: 10.00
Procurement and contract management 801 (IPJ 801) - Credits: 10.00
Information technology and service project management 803 (IPK 803) - Credits: 10.00
Risk management 801 (IRI 801) - Credits: 10.00
Project systems engineering 802 (ISE 802) - Credits: 10.00
Construction management 803 (KBS 803) - Credits: 10.00

Curriculum: Final year

Core modules

Mini-dissertation 899 (IGB 899) - Credits: 90.00
Quality and integration management 801 (IQM 801) - Credits: 10.00

Elective modules

Systems thinking 801 (IBI 801) - Credits: 10.00
Industrial marketing 801 (IIM 801) - Credits: 10.00
Commercialisation and intellectual property 881 (IKG 881) - Credits: 10.00
Knowledge and information management 884 (ILB 884) - Credits: 10.00
Legal aspects 803 (ILC 803) - Credits: 10.00
Sustainability 802 (ILE 802) - Credits: 10.00
New product development 880 (INP 880) - Credits: 10.00
New ventures and entrepreneurship 801 (IOE 801) - Credits: 10.00

MEng Software Engineering (12250204)

Minimum duration of study 1 year

Programme information

- Unless the Dean, on recommendation of the relevant head of department, decides otherwise, the master's degree is conferred on the basis of a dissertation (including, where applicable, an examination on the dissertation).
- A minimum of 128 credits is required to obtain the MEng degree.
- Recognition is not granted for credits acquired during studying for the BEngHons or the BScHons.
- The various departmental postgraduate brochures should also be consulted.

Admission requirements

- A BEng Hons degree awarded by the University of Pretoria, or an equivalent qualification. The applicant must have passed this degree with a weighted average of at least 65%.
- The applicant must also meet the admission requirements for the BEng Hons degree.
- The departmental Postgraduate Committee may require additional honours modules for non-degree purposes where background is insufficient.
- The departmental Postgraduate Committee may request evidence of knowledge of research methodology.
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.
- The applicant must determine the research group/focus area and a potential supervisor and confirm the potential supervisor's availability (see departmental website for research groups and heads of research groups). Admission will be granted only if the intended research fits in with the research foci of the Department and the supervision capacity exists, as decided by the Head of the Department.

Examinations and pass requirements

The stipulations of the relevant Faculty regulations are applicable.

The Dean may, on recommendation of the relevant head of department, exempt a student from the examination on the dissertation.

The average mark awarded by all the examiners is the final mark, with the pass mark being at least 50%.

Research information

A student must by means of a dissertation prove that he or she is capable of planning, instituting and executing a scientific investigation. Unless the Senate, on the recommendation of the supervisor, decides otherwise, a student, before or on submission of a dissertation, must submit proof issued by a recognised academic journal that an article was submitted, to the Head: Student Administration. The draft article should be based on the research that the student has conducted for the dissertation and be approved by the supervisor if the supervisor is not a co-author. The supervisor shall be responsible for ensuring that the paper is taken through all the processes of revision and resubmission, as may be necessary. Conferment of the degree may be made subject to compliance with the stipulations of this regulation.

Pass with distinction

A student passes with distinction if an average mark of at least 75% is obtained for the dissertation (and the examination on the dissertation, where applicable).

Curriculum: Final year

Core modules

Dissertation 890 (EPR 890) - Credits: 180.00

MEng Structural Engineering (12250122)

Minimum duration of study 1 year

Programme information

- Unless the Dean, on recommendation of the relevant head of department, decides otherwise, the master's degree is conferred on the basis of a dissertation (including, where applicable, an examination on the dissertation).
- A minimum of 128 credits is required to obtain the MEng degree.
- Recognition is not granted for credits acquired during studying for the BEngHons or the BScHons.
- The various departmental postgraduate brochures should also be consulted.

Admission requirements

- A BEng Hons degree awarded by the University of Pretoria, or an equivalent qualification. The applicant must have passed this degree with a weighted average of at least 65%.
- The applicant must also meet the admission requirements for the BEng Hons degree.
- The departmental Postgraduate Committee may require additional honours modules for non-degree purposes where background is insufficient.
- The departmental Postgraduate Committee may request evidence of knowledge of research methodology.
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.
- The applicant must determine the research group/focus area and a potential supervisor and confirm the potential supervisor's availability (see departmental website for research groups and heads of research groups). Admission will be granted only if the intended research fits in with the research foci of the Department and the supervision capacity exists, as decided by the Head of the Department.

Examinations and pass requirements

The stipulations of the relevant Faculty regulations are applicable.

The Dean may, on recommendation of the relevant head of department, exempt a student from the examination on the dissertation.

The average mark awarded by all the examiners is the final mark, with the pass mark being at least 50%.

Research information

A student must by means of a dissertation prove that he or she is capable of planning, instituting and executing a

scientific investigation. Unless the Senate, on the recommendation of the supervisor, decides otherwise, a student, before or on submission of a dissertation, must submit proof issued by a recognised academic journal that an article was submitted, to the Head: Student Administration. The draft article should be based on the research that the student has conducted for the dissertation and be approved by the supervisor if the supervisor is not a co-author. The supervisor shall be responsible for ensuring that the paper is taken through all the processes of revision and resubmission, as may be necessary. Conferment of the degree may be made subject to compliance with the stipulations of this regulation.

Pass with distinction

A student passes with distinction if an average mark of at least 75% is obtained for the dissertation (and the examination on the dissertation, where applicable).

Curriculum: Final year

Core modules

Dissertation: Structural engineering 890 (SIN 890) - Credits: 180.00

MEng Technology and Innovation Management (Coursework) (12250254)

Minimum duration of study 2 years

Programme information

- Unless the Dean, on recommendation of the relevant head of department, decides otherwise, the master's degree is conferred on the basis of examinations of coursework and a mini-dissertation (including an examination on the mini-dissertation).
- A minimum of 180 credits is required to obtain the MEng degree. A mini-dissertation (90 credits) and coursework (90 credits) is included in the programme.
- Recognition is not granted for credits acquired during studying for the BEngHons or the BSchHons.
- The curriculum is determined in consultation with the relevant head of department. Any specific module is offered on condition that a minimum number of students are registered for the module, as determined by the relevant head of department and the Dean. Students must consult the relevant head of department in order to compile a meaningful programme, as well as for information on the syllabi of the modules. The various departmental postgraduate brochures should also be consulted.

Admission requirements

A four-year bachelor's degree in Engineering from a recognised institution.

- Three years of relevant post-graduate work experience.
- The Department has limited supervisory capacity and only accepts applicants for whom supervision can be provided. The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and work experience and to decide if the applicant is suitable for postgraduate studies. Based on this, the three years of work experience may be waived.

Examinations and pass requirements

The stipulations of the relevant Faculty regulations are applicable.

Guidelines for the preparation and examination of mini-dissertations are available from the department.

- i. The examination in each module for which a student is registered, takes place during the normal examination

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- period after the conclusion of lectures (i.e. October/November or May/June).
- ii. A student registered for the masters degree must complete his or her studies within three years provided that the Dean, on recommendation of the relevant head of department, may approve a stipulated limited extension of this period.
 - iii. A student must obtain at least 50% in an examination for each module where no semester or year mark is required. A module may only be repeated once.
 - iv. In modules where semester or year marks are awarded, a minimum examination mark of 40% and a final mark of 50% is required.
 - v. No supplementary or special examinations are granted at postgraduate level.

Research information

A student must by means of a mini-dissertation prove that he or she is capable of planning, instituting and executing a scientific investigation. As part of the examination a student must submit an article and present at the final year symposium. The article should be based on the research that the student has conducted for the dissertation and be approved by the supervisor. Conferment of the degree may be made subject to compliance with the stipulations of this regulation.

Pass with distinction

A student who completes the master's degree on grounds of coursework and a mini-dissertation, passes with distinction if a weighted average mark of at least 75% is obtained in the first 180 credits obtained for the degree provided that 90 of these credits are allocated to the mini-dissertation. However, the degree is not awarded with distinction should a student fail any of these modules (excluding modules which have been timeously discontinued). The degree is also not awarded with distinction if a student obtains less than 70% for the mini-dissertation. The degree must be completed within the prescribed study period.

Curriculum: Year 1

Core modules

Corporate entrepreneurship 880 (IEE 880) - Credits: 10.00
Mini-dissertation 899 (IGB 899) - Credits: 90.00
New product development 880 (INP 880) - Credits: 10.00
Organisation and innovation 880 (INV 880) - Credits: 10.00
Science, technology and innovation policy 880 (ISP 880) - Credits: 10.00
Strategic technology and innovation management 880 (IST 880) - Credits: 10.00
Fundamentals of technology management 802 (ITB 802) - Credits: 10.00

Curriculum: Final year

Core modules

Project economics 880 (IBD 880) - Credits: 10.00
Mini-dissertation 899 (IGB 899) - Credits: 90.00

Elective modules

Systems thinking 801 (IBI 801) - Credits: 10.00
Industrial marketing 801 (IIM 801) - Credits: 10.00
Commercialisation and intellectual property 881 (IKG 881) - Credits: 10.00
Quality management 801 (IKK 801) - Credits: 10.00

Knowledge and information management 884 (ILB 884) - Credits: 10.00

Legal aspects 803 (ILC 803) - Credits: 10.00

Sustainability 802 (ILE 802) - Credits: 10.00

Project planning 802 (IMP 802) - Credits: 10.00

New ventures and entrepreneurship 801 (IOE 801) - Credits: 10.00

Programme and portfolio management 802 (IPM 802) - Credits: 10.00

Risk management 801 (IRI 801) - Credits: 10.00

MEng Transportation Engineering (12250112)

Minimum duration of study 1 year

Programme information

- Unless the Dean, on recommendation of the relevant head of department, decides otherwise, the master's degree is conferred on the basis of a dissertation (including, where applicable, an examination on the dissertation).
- A minimum of 128 credits is required to obtain the MEng degree.
- Recognition is not granted for credits acquired during studying for the BEngHons or the BScHons.
- The various departmental postgraduate brochures should also be consulted.

Admission requirements

- A BEng Hons degree awarded by the University of Pretoria, or an equivalent qualification. The applicant must have passed this degree with a weighted average of at least 65%.
- The applicant must also meet the admission requirements for the BEng Hons degree.
- The departmental Postgraduate Committee may require additional honours modules for non-degree purposes where background is insufficient.
- The departmental Postgraduate Committee may request evidence of knowledge of research methodology.
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.
- The applicant must determine the research group/focus area and a potential supervisor and confirm the potential supervisor's availability (see departmental website for research groups and heads of research groups). Admission will be granted only if the intended research fits in with the research foci of the Department and the supervision capacity exists, as decided by the Head of the Department.

Examinations and pass requirements

The stipulations of the relevant Faculty regulations are applicable.

The Dean may, on recommendation of the relevant head of department, exempt a student from the examination on the dissertation.

The average mark awarded by all the examiners is the final mark, with the pass mark being at least 50%.

Research information

A student must by means of a dissertation prove that he or she is capable of planning, instituting and executing a

scientific investigation. Unless the Senate, on the recommendation of the supervisor, decides otherwise, a student, before or on submission of a dissertation, must submit proof issued by a recognised academic journal that an article was submitted, to the Head: Student Administration. The draft article should be based on the research that the student has conducted for the dissertation and be approved by the supervisor if the supervisor is not a co-author. The supervisor shall be responsible for ensuring that the paper is taken through all the processes of revision and resubmission, as may be necessary. Conferment of the degree may be made subject to compliance with the stipulations of this regulation.

Pass with distinction

A student passes with distinction if an average mark of at least 75% is obtained for the dissertation (and the examination on the dissertation, where applicable).

Curriculum: Final year

Core modules

Dissertation 890 (SVI 890) - Credits: 180.00

MEng Water Resources Engineering (12250162)

Minimum duration of study 1 year

Programme information

- Unless the Dean, on recommendation of the relevant head of department, decides otherwise, the master's degree is conferred on the basis of a dissertation (including, where applicable, an examination on the dissertation).
- A minimum of 128 credits is required to obtain the MEng degree.
- Recognition is not granted for credits acquired during studying for the BEngHons or the BScHons.
- The various departmental postgraduate brochures should also be consulted.

Admission requirements

- A BEng Hons degree awarded by the University of Pretoria, or an equivalent qualification. The applicant must have passed this degree with a weighted average of at least 65%.
- The applicant must also meet the admission requirements for the BEng Hons degree.
- The departmental Postgraduate Committee may require additional honours modules for non-degree purposes where background is insufficient.
- The departmental Postgraduate Committee may request evidence of knowledge of research methodology.
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.
- The applicant must determine the research group/focus area and a potential supervisor and confirm the potential supervisor's availability (see departmental website for research groups and heads of research groups). Admission will be granted only if the intended research fits in with the research foci of the Department and the supervision capacity exists, as decided by the Head of the Department.

Examinations and pass requirements

The stipulations of the relevant Faculty regulations are applicable.

The Dean may, on recommendation of the relevant head of department, exempt a student from the examination on the dissertation.

The average mark awarded by all the examiners is the final mark, with the pass mark being at least 50%.

Research information

A student must by means of a dissertation prove that he or she is capable of planning, instituting and executing a scientific investigation. Unless the Senate, on the recommendation of the supervisor, decides otherwise, a student, before or on submission of a dissertation, must submit proof issued by a recognised academic journal that an article was submitted, to the Head: Student Administration. The draft article should be based on the research that the student has conducted for the dissertation and be approved by the supervisor if the supervisor is not a co-author. The supervisor shall be responsible for ensuring that the paper is taken through all the processes of revision and resubmission, as may be necessary. Conferment of the degree may be made subject to compliance with the stipulations of this regulation.

Pass with distinction

A student passes with distinction if an average mark of at least 75% is obtained for the dissertation (and the examination on the dissertation, where applicable).

Curriculum: Final year

Core modules

Dissertation: [Water resource engineering 890](#) (WBK 890) - Credits: 180.00

MEng Water Utilisation Engineering (12250102)

Minimum duration of study 1 year

Programme information

- Unless the Dean, on recommendation of the relevant head of department, decides otherwise, the master's degree is conferred on the basis of a dissertation (including, where applicable, an examination on the dissertation).
- A minimum of 128 credits is required to obtain the MEng degree.
- Recognition is not granted for credits acquired during studying for the BEngHons or the BScHons.
- The various departmental postgraduate brochures should also be consulted.

Admission requirements

- A BEng Hons degree awarded by the University of Pretoria, or an equivalent qualification. The applicant must have passed this degree with a weighted average of at least 65%.
- The applicant must also meet the admission requirements for the BEng Hons degree.
- The departmental Postgraduate Committee may require additional honours modules for non-degree purposes where background is insufficient.
- The departmental Postgraduate Committee may request evidence of knowledge of research methodology.

- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.
- The applicant must determine the research group/focus area and a potential supervisor and confirm the potential supervisor's availability (see departmental website for research groups and heads of research groups). Admission will be granted only if the intended research fits in with the research foci of the Department and the supervision capacity exists, as decided by the Head of the Department.

Examinations and pass requirements

The stipulations of the relevant Faculty regulations are applicable.

The Dean may, on recommendation of the relevant head of department, exempt a student from the examination on the dissertation.

The average mark awarded by all the examiners is the final mark, with the pass mark being at least 50%.

Research information

A student must by means of a dissertation prove that he or she is capable of planning, instituting and executing a scientific investigation. Unless the Senate, on the recommendation of the supervisor, decides otherwise, a student, before or on submission of a dissertation, must submit proof issued by a recognised academic journal that an article was submitted, to the Head: Student Administration. The draft article should be based on the research that the student has conducted for the dissertation and be approved by the supervisor if the supervisor is not a co-author. The supervisor shall be responsible for ensuring that the paper is taken through all the processes of revision and resubmission, as may be necessary. Conferment of the degree may be made subject to compliance with the stipulations of this regulation.

Pass with distinction

A student passes with distinction if an average mark of at least 75% is obtained for the dissertation (and the examination on the dissertation, where applicable).

Curriculum: Final year

Core modules

Dissertation 800 (CVD 800) - Credits: 180.00

MIntArch (12252027)

Minimum duration of study 1 year

Contact	Dr N Botes	nico.botes@up.ac.za	+27 (0)124204600
	Prof AAJ Barker	arthur.barker@up.ac.za	+27 (0)124204542

Programme information

By virtue of dissertation and examination.

Refer to General Regulations G.30 to G.40 and G.50 to G.54.

Admission requirements

- A BArch Hons degree or an applicable degree in a relevant field (such as urban design, civil engineering, planning, construction, geography, visual arts, sociology, or any other field deemed acceptable by the departmental Postgraduate Committee); or a BArch or equivalent four-year degree NQF level 8 (or NQF level 7 for qualifications obtained before 2009); or a three-year degree with design as major component, NQF level 7 (NQF level 6 for qualifications obtained before 2009) and successfully completed supplementary modules relevant to the study field at honours (700) level to the equivalent of 180 credits as prescribed by the departmental Postgraduate Committee.
- Only candidates with a minimum average of 60% in the highest year of study will be considered. The departmental Postgraduate Committee reserves the right to decide if the applicant is suitable for postgraduate studies based on the academic transcript and required application documentation. The Department only accepts candidates for whom it is able to provide supervision. The applicant must intend to do research in the domain of interior architecture, must determine the research focus area and a potential supervisor and confirm the potential supervisor's availability (see departmental website for research focus areas, potential supervisors, as well as required application documentation and procedures).

Examinations and pass requirements

After a minimum of one year of registration the student submits a dissertation for examination and has an oral examination of the dissertation in the related field of study.

The Master of Interior Architecture degree is conferred on students obtaining a minimum of 50% for both the dissertation and oral examination.

Research information

General Regulation G.39.12 applies.

Pass with distinction

The Master of Interior Architecture degree is conferred with distinction on students obtaining a minimum of 75% in both the dissertation and the oral examination.

Curriculum: Final year

Core modules

Dissertation: Interior architecture 890 (INT 890) - Credits: 180.00

MIntArch (Professional) (12252028)

Minimum duration of study 1 year

Contact	Dr N Botes	nico.botes@up.ac.za	+27 (0)124204600
	Prof AAJ Barker	arthur.barker@up.ac.za	+27 (0)124204542

Programme information

The Master of Interior Architecture (Professional) is done by coursework, a design investigation mini-dissertation and design project and discourse.

Refer to General Regulations G.30 to G.40 and G.50 to G.54.

Admission requirements

- A Bint Hons degree; or an equivalent degree that includes spatial design at NQF level 8 (or NQF level 7 for qualifications obtained before 2009).
- The departmental Postgraduate Committee may require an evaluation in fields of knowledge and registration for additional modules for non-degree purposes.
- An applicant who has completed a Bint Hons degree at the University of Pretoria with a minimum average of 60% for all modules in the honours curriculum (completed in the same academic year) will be granted admission into this degree.
- All other applicants must have practical experience and/or a record of an extended study excursion, submit a portfolio and design journal, and are interviewed for selection.
- A limited number of applicants are admitted to this degree. Refer to the departmental website for guidelines.

Other programme-specific information

Design topic

The topic of the final design project (DIT 803 & DPD 803) must be approved by the relevant head of department.

Awarding of degree

The degree is awarded to those students having obtained the prescribed credits. Those students admitted with conditions must comply with all of these before all the 700 series module credits and the degree are awarded.

Examinations and pass requirements

The minimum pass mark is 50%. A minimum of 40% is required in the examination, with a minimum final mark of 50% to pass. If a module is not evaluated by examination, a minimum coursework mark of 50% is required.

If the module is not evaluated by coursework, a minimum examination mark of 50% is required.

Research information

General Regulation G.39.12 applies with regard to the required publication.

Pass with distinction

The degree is conferred with distinction on those students registering for the first time and obtaining a distinction (75%) simultaneously for both the Design investigation mini-dissertation (DIT 803) and the Design project and discourse (DPD 803) with the proviso that the degree is completed within the minimum prescribed time and all other final-year modules are passed on first registration.

Curriculum: Final year

Core modules

[Continuing practice development 810](#) (CPD 810) - Credits: 15.00

[Design investigation 803](#) (DIT 803) - Credits: 75.00

[Mini-dissertation: Design project and discourse 803](#) (DPD 803) - Credits: 90.00

MIS Information Science (12254010)

Minimum duration of study 1 year

Contact [Prof I Fourie](#) ina.fourie@up.ac.za +27 (0)124205216

Admission requirements

- BIS Hons Library Science/Information Science/Multimedia/ Publishing degree; or MA (Development Communication); or any applicable honours degree, and an average of at least 65%. • The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and to decide if the applicant is suitable for postgraduate studies.
- The applicant must determine the research group/focus area and a potential supervisor and confirm the potential supervisor's availability (see departmental website for research groups and heads of research groups) and submit an abstract on the proposed research idea of approximately 800 to 1200 words.

Additional requirements

Consult G Regulations G.30 to G.40 and G.54.

Other programme-specific information

The Dean may, in exceptional cases, and on the recommendation of the relevant head of department, approve a fixed limited extension of the period of study.

Curriculum: Final year

Core modules

Dissertation: Information science 890 (INL 890) - Credits: 180.00

MIS Library Science (12254009)

Minimum duration of study 1 year

Admission requirements

- BISHons in Library Science/Information Science/Multimedia/ Publishing degree; or MA (Development Communication); or any applicable honours degree, and an average of at least 65%.
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and to decide if the applicant is suitable for postgraduate studies.
- The applicant must determine the research group/focus area and a potential supervisor and confirm the potential supervisor's availability (see departmental website for research groups and heads of research groups), and submit an abstract on proposed research ideas of approximately 800 to 1200 words on the proposed research.

Additional requirements

Consult G Regulations G.30 to G.40 and G.54.

Other programme-specific information

The Dean may, in exceptional cases, and on the recommendation of the relevant head of department, approve a fixed limited extension of the period of study.

Curriculum: Final year

Core modules

Dissertation: [Library science 890](#) (BIB 890) - Credits: 180.00

MIS Multimedia (12254011)

Minimum duration of study 1 year

Contact [Prof TJD Bothma](#) theo.bothma@up.ac.za +27 (0)124202961

Admission requirements

BIS and BISHons specialising in any of the specific packages for:

- Library Science
- Information Science
- Multimedia
- Publishing
- **or** any equivalent honours degree.

Additional requirements

Consult G Regulations G.30 to G.40 and G.54.

Other programme-specific information

The Dean may, in exceptional cases, and on the recommendation of the relevant head of department, approve a fixed limited extension of the period of study.

Curriculum: Final year

Core modules

Dissertation: [Multimedia 890](#) (IMY 890) - Credits: 180.00

MIS Publishing (12254012)

Minimum duration of study 1 year

Contact [Prof EH le Roux](#) beth.leroux@up.ac.za +27 (0)124202426

Admission requirements

- A BIS Hons degree specialising in any of the following: Library Science/Information Science/Multimedia/Publishing; or MA (Development Communication) degree; or any applicable honours degree, and an average of at least 65%.
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and to decide if the applicant is suitable for postgraduate studies.
- The applicant must determine the research group/focus area and a potential supervisor and confirm the potential supervisor's availability (see departmental website for research groups and heads of research groups), and submit an abstract on the proposed research idea of approximately 800 to 1200 words.

Additional requirements

Consult G Regulations G.30 to G.40 and G.54.

Other programme-specific information

The Dean may, in exceptional cases, and on the recommendation of the relevant head of department, approve a fixed limited extension of the period of study.

Curriculum: Final year

Core modules

Dissertation: Publishing 890 (PUB 890) - Credits: 180.00

MIT Big Data Science (Coursework) (12254017)

Minimum duration of study 2 years

Programme information

This degree programme is presented in English only.

Also consult G Regulations G.30 to G.54

The curriculum is determined in consultation with the programme organiser.

A student will have to apply to the Dean of the Faculty of Engineering, Built Environment and Information Technology if he/she requires more than three years to complete the degree.

Admission requirements

- A BIS Hons degree specialising in any of the following: Library Science/Information Science/Multimedia/Publishing; or MA (Development Communication) degree; or any applicable honours degree, and an average of at least 65%.
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and to decide if the applicant is suitable for postgraduate studies.
- The applicant must determine the research group/focus area and a potential supervisor and confirm the potential supervisor's availability (see departmental website for research groups and heads of research groups), and submit an abstract on the proposed research idea of approximately 800 to 1200 words.

Other programme-specific information

Discontinuation of studies

The Dean may, on the recommendation of the admissions committee, cancel the studies of a student who fails more than one module. A module may only be repeated once.

Deregistration of modules

Deregistration of modules is only allowed before the early deadline.

Examinations and pass requirements

A minimum semester mark of 40% is required in order to be admitted to the final examinations in all the prescribed modules of the degree. A final mark of 50% is required to pass all coursework modules and the mini-dissertation.

Pass with distinction

The degree is conferred with distinction on students who have obtained at least 75% for the mini-dissertation and a minimum of 75% weighted average final mark for the coursework modules.

Curriculum: Year 1

Core modules

Introduction to big data science 800 (MIT 800) - Credits: 5.00
Introduction to machine and statistical learning 801 (MIT 801) - Credits: 15.00
Introduction to data platforms and sources 802 (MIT 802) - Credits: 5.00
Introduction to Information Ethics for Big Data Science 803 (MIT 803) - Credits: 5.00
Introduction to mathematical optimization for big data science 804 (MIT 804) - Credits: 5.00
Big data 805 (MIT 805) - Credits: 10.00
Big data management 806 (MIT 806) - Credits: 10.00
Research methods for big data science 809 (MIT 809) - Credits: 5.00

Elective modules

Big data science elective 801 (COS 801) - Credits: 5.00
Big data science elective 802 (COS 802) - Credits: 5.00
Big data science elective 801 (ERZ 801) - Credits: 5.00
Big data science elective 802 (ERZ 802) - Credits: 5.00
Big data science elective 801 (INF 801) - Credits: 5.00
Big data science elective 802 (INF 802) - Credits: 5.00
Big data science elective 820 (INL 820) - Credits: 5.00
Statistics elective 801 (STK 801) - Credits: 5.00
Statistics elective 802 (STK 802) - Credits: 5.00
Big data science elective 801 (WTW 801) - Credits: 5.00
Big data science elective 802 (WTW 802) - Credits: 5.00

Curriculum: Final year

Core modules

Mini dissertation in big data science 807 (MIT 807) - Credits: 90.00
Big data science project 808 (MIT 808) - Credits: 20.00

MIT ICT Information Science (Coursework) (12254016)

Minimum duration of study 2 years

Programme information

This degree programme is presented in English only.

Also consult G Regulations G.30 to G.54

The curriculum is determined in consultation with the programme organiser.

A student will have to apply to the Dean of the Faculty of Engineering, Built Environment and Information Technology if he/she requires more than three years to complete the degree.

Admission requirements

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- A three-year first degree in Library and Information Science (LIS), as well as a second degree in LIS or at least an honours degree in LIS; or a four-year degree in LIS; or a master's degree in LIS; or an equivalent degree from a SAQA-accredited university.
 - A limited number of applicants are admitted to this programme.

Other programme-specific information

Discontinuation of studies

The Dean may, on the recommendation of the admissions committee, cancel the studies of a student who fails more than one module. A module may only be repeated once.

Deregistration of modules

Deregistration of modules is only allowed before the early deadline.

Students may register for two modules in another master's programme with the permission of the Programme Coordinators of both degrees.

Examinations and pass requirements

A minimum semester mark of 40% is required in order to be admitted to the final examinations in all the prescribed modules of the degree. A final mark of 50% is required to pass all coursework modules and the mini-dissertation.

Pass with distinction

The degree is conferred with distinction on students who have obtained at least 75% for the mini-dissertation and a minimum of 75% weighted average final mark for the coursework modules and completed the degree in minimum time.

Curriculum: Year 1

Core modules

Research data management 885 (MIT 885) - Credits: 15.00

Institutional repositories and virtual work environments 886 (MIT 886) - Credits: 15.00

The knowledge society in the Fourth Industrial Revolution 887 (MIT 887) - Credits: 10.00

Information ethics 889 (MIT 889) - Credits: 10.00

Data, information and knowledge management 890 (MIT 890) - Credits: 15.00

Facilitating information retrieval and information use 891 (MIT 891) - Credits: 15.00

IT Research 892 (MIT 892) - Credits: 10.00

Curriculum: Final year

Core modules

Mini-dissertation 880 (MIT 880) - Credits: 90.00

MIT ICT Management (Coursework) (12254015)

Minimum duration of study 2 years

Programme information

This degree programme is presented in English only.

Also consult G Regulations G.30 to G.54

The curriculum is determined in consultation with the programme organiser.

A student will have to apply to the Dean of the Faculty of Engineering, Built Environment and Information Technology if he/she requires more than three years to complete the degree.

Admission requirements

- An appropriate honours or four-year bachelor's degree, and an average of at least 65%.
- A pass mark in Mathematics at NSC level or another qualification in Mathematics, Statistics, Mathematical Statistics or equivalent.
- Relevant work experience.
- Success in the selection process (refer to the departmental website for guidelines) is based on a recommendation letter from the employer/line manager, indicating a commitment that they will make time available for the employee to devote to the studies; an essay/motivation letter motivating the interest in this degree; and a CV (a template is available on the departmental website).
- A limited number of applicants are admitted to this degree.

Other programme-specific information

Discontinuation of studies

The Dean may, on the recommendation of the admissions committee, cancel the studies of a student who fails more than one module. A module may only be repeated once.

Deregistration of modules

Deregistration of modules is only allowed before the early deadline.

Students may register for two modules in another master's programme with the permission of the Programme Coordinators of both degrees.

Examinations and pass requirements

A minimum semester mark of 40% is required in order to be admitted to the final examinations in all the prescribed modules of the degree. A final mark of 50% is required to pass all coursework modules and the mini-dissertation.

Pass with distinction

The degree is conferred with distinction on students who have obtained at least 75% for the mini-dissertation and a minimum of 75% weighted average final mark for the coursework modules and completed the degree in minimum time.

Curriculum: Year 1

Core modules

Digital economy 845 (MIT 845) - Credits: 15.00

Information and knowledge management 846 (MIT 846) - Credits: 15.00

ICT management 847 (MIT 847) - Credits: 15.00

Strategic ICT management and governance 848 (MIT 848) - Credits: 15.00

Life-cycle and maturity models for IT 849 (MIT 849) - Credits: 10.00

Enterprise systems 854 (MIT 854) - Credits: 10.00

IT research 855 (MIT 855) - Credits: 10.00

Curriculum: Final year

Core modules

Mini-dissertation 840 (MIT 840) - Credits: 90.00

MIT Information Systems (12254013)

Minimum duration of study 1 year

Admission requirements

Subject to the stipulations of G Regulations G.1.3 and G.54, an appropriate honours degree is a requirement for admission.

The Dean has the right of authorisation regarding matters not provided for in the G Regulations or the Faculty-specific regulations.

A candidate may be refused admission to a master's degree by the Chairperson of the School of Information Technology if he or she does not comply with the standard of competence in the subject as determined by the department – with the proviso that a candidate, who does not comply with the required level of competence, may be admitted, provided that he or she completes additional study assignments and/or examinations.

The Chairperson of the School of Information Technology may set additional admission requirements.

Specific departments have specific requirements for admission which will be published in the Postgraduate Brochure of the Faculty.

The number of students will be determined in line with the growth strategy of the University of Pretoria as approved by the Executive.

The Dean reserves the right to place meritorious candidates to improve the diversity profile of students.

Other programme-specific information

The Dean may, on the recommendation of the Postgraduate Committee, cancel the registration of a student during any academic year if his/her academic progress is not satisfactory.

The degree programme must be completed within four years after the first registration for the degree, provided that the Dean may, in exceptional cases, and on the recommendation of the relevant head of department, approve a fixed limited extension of the period of study.

Research information

A dissertation must be submitted on a field of study as approved by the Department.

Curriculum: Final year

Core modules

Dissertation: Information systems 890 (ISY 890) - Credits: 180.00

MLArch (12252029)

Minimum duration of study 1 year

Contact	Dr N Botes	nico.botes@up.ac.za	+27 (0)124204600
	Prof AAJ Barker	arthur.barker@up.ac.za	+27 (0)124204542

Programme information

By virtue of dissertation and examination.

Also refer to General Regulations G.30 to G.40 and G.50 to G.54.

Admission requirements

- A BArch Hons degree or an applicable degree in a relevant field (such as urban design, civil engineering, planning, construction, geography, visual arts, sociology, or any other field deemed acceptable by the departmental Postgraduate Committee); or a BArch degree; or equivalent four-year degree at NQF level 8 (or NQF level 7 for qualifications obtained before 2009); or a three-year degree with design as major component at NQF level 7 (NQF level 6 for qualifications obtained before 2009) and successfully completed supplementary modules relevant to the study field at honours (700) level to the equivalent of 180 credits as prescribed by the departmental Postgraduate Committee.
- Only candidates with a minimum average of 60% in the highest year of study will be considered. The departmental Postgraduate Committee reserves the right to decide if the applicant is suitable for postgraduate studies based on the academic transcript and required application documentation. The Department only accepts candidates for whom it is able to provide supervision. The applicant must intend to do research in the domain of landscape architecture, must determine the research focus area and a potential supervisor and confirm the potential supervisor's availability (see departmental website for research focus areas, potential supervisors, as well as required application documentation and procedures).

Examinations and pass requirements

After a minimum of one year of registration the student submits a dissertation for examination and takes an oral examination of the dissertation in the related field of study.

The Master of Landscape Architecture degree is conferred on a student who has obtained a minimum of 50% for both the dissertation and oral examination.

Research information

General Regulation G.39.12 applies.

Pass with distinction

The Master of Landscape Architecture degree is conferred with distinction on a student obtaining a minimum of 75% in both the dissertation and the oral examination.

Curriculum: Final year

Core modules

Dissertation: Landscape architecture 890 (LAN 890) - Credits: 180.00

MLArch (Professional) (12252030)

Minimum duration of study 1 year

Contact	Dr N Botes	nico.botes@up.ac.za	+27 (0)124204600
	Prof AAJ Barker	arthur.barker@up.ac.za	+27 (0)124204542

Programme information

The Master of Landscape Architecture (Professional) is a taught master's degree for the purpose of registration as a candidate professional landscape architect with the South African Council for the Landscape Architectural Profession in terms of Act 45 of 2000 and is done by coursework, projects and a design investigation mini-dissertation and design project and discourse.

Also refer to General Regulations G.30 to G.40 and G.50 to G.54.

Admission requirements

- A BLArch Hons degree; or an equivalent degree which includes spatial design at NQF level 8 (or NQF level 7 for qualifications obtained before 2009). The departmental Postgraduate Committee may require an evaluation in fields of knowledge and registration for additional modules for non-degree purposes.
- An applicant who has completed a BLArch Hons degree at the University of Pretoria with a minimum average of 60% for all modules in the honours curriculum (completed in the same academic year) will be granted admission to this degree.
- All other applicants must have practical experience and/or a record of an extended study excursion, submit a portfolio and design journal, and are interviewed for selection.

A limited number of applicants are admitted to this degree. Refer to the departmental website

Other programme-specific information

Design topic

The topic of the final design project (DIT 802 & DPD 802) must be approved by the relevant head of department.

Awarding of degree

The degree is awarded to those students who have obtained the prescribed credits. Those students admitted with conditions must comply with all of these before all the 700 series module credits and the degree are awarded.

Examinations and pass requirements

The minimum pass mark is 50%. A minimum of 40% is required in the examination, with a minimum final mark of 50% to pass. If a module is not evaluated by examination a minimum coursework mark of 50% is required. If the module is not evaluated by coursework a minimum examination mark of 50% is required.

Research information

General Regulation G.39.12. applies.

Pass with distinction

The degree is conferred with distinction on those students registering for the first time and obtaining a distinction (75%) simultaneously for both the Design investigation mini-dissertation (DIT 802) and the Design project and

discourse (DPD 802) with the proviso that the degree is completed within the minimum prescribed time and all other final-year modules are passed on first registration.

Curriculum: Final year

Core modules

Continuing practice development 810 (CPD 810) - Credits: 15.00

Design investigation 802 (DIT 802) - Credits: 75.00

Mini-dissertation: Design project and discourse 802 (DPD 802) - Credits: 90.00

MSc Applied Science Architecture (Coursework) (12252038)

Minimum duration of study

1 year

Contact

Prof C Combrinck carin.combrinck@up.ac.za +27 (0)124206536

Dr N Botes nico.botes@up.ac.za +27 (0)124204600

Programme information

By virtue of a curriculum with coursework and a mini-dissertation.

Also refer to G Regulations G.1.2, G.30 to G.40 and G.50 to G.54.

Admission requirements

- A BSc Hons degree; or equivalent tertiary qualification in one of the recognised disciplines of interest to the department: urban design, civil engineering, planning, construction, geography, visual arts, ecology, or any other field deemed acceptable by the departmental Postgraduate Committee.
- A limited number of applicants are admitted to this programme and are interviewed for selection. An applicant must submit a CV with specific reference to the academic record and a personal statement outlining the proposed direction of the programme and its alignment with the departmental research areas. Refer to the departmental website.

Other programme-specific information

The curriculum is compiled in consultation with the relevant head of department.

It is the responsibility of students to ascertain that the lectures in the appropriate research field are on offer in the specific year of study. The attendance of lectures is compulsory.

The topic of the mini-dissertation must be approved by the relevant head of department.

Examinations and pass requirements

A minimum of 50% is required in the examination of the coursework, with a minimum final mark of 50% to pass.

A minimum of 50% is required to pass the mini-dissertation.

Research information

G Regulation G.39.12 applies.

Pass with distinction

The degree is conferred with distinction on a student who obtains a weighted average of 75%, having obtained at

least 75% in the mini-dissertation and a weighted average of at least 70% in the remaining coursework constituting the required credits for RFS module of the degree.

Curriculum: Final year

Core modules

Mini-dissertation 895 (ARG 895) - Credits: 110.00

Research field studies 890 (RFS 890) - Credits: 35.00

MSc Applied Science Chemical Technology (12253062)

Minimum duration of study 1 year

Programme information

The MSc (Applied Science) degree is conferred by the same departments as the BScHons (Applied Science) degree.

A minimum of 128 credits is required to obtain the MSc degree. Either a mini-dissertation (64 credits) and coursework (64 credits) or a dissertation (128 credits) is included in the programme.

Unless the Dean, on recommendation of the relevant head of department, decides otherwise, the master's degree is conferred on the basis of examinations of coursework and a mini-dissertation or a dissertation (including an examination on the dissertation).

Admission requirements

- An appropriate BSc Hons degree (or equivalent). The applicant must have passed this degree with a weighted average of at least 65%.
- The departmental Postgraduate Committee may require additional honours modules for non-degree purposes where background is insufficient.
- The departmental Postgraduate Committee may request evidence of knowledge of research methodology.
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.
- The applicant must determine the research group/focus area and a potential supervisor and confirm the potential supervisor's availability (see departmental website for research groups and heads of research groups). Admission will be granted only if the intended research fits in with the research foci of the Department and the supervision capacity exists, as decided by the Head of the Department.

Curriculum: Final year

Core modules

Dissertation 807 (CVD 807) - Credits: 180.00

MSc Applied Science Control (12253061)

Minimum duration of study 1 year

Programme information

The MSc (Applied Science) degree is conferred by the same departments as the BScHons (Applied Science) degree.

A minimum of 128 credits is required to obtain the MSc degree. Either a mini-dissertation (64 credits) and coursework (64 credits) or a dissertation (128 credits) is included in the programme.

Unless the Dean, on recommendation of the relevant head of department, decides otherwise, the master's degree is conferred on the basis of examinations of coursework and a mini-dissertation or a dissertation (including an examination on the dissertation).

Admission requirements

Subject to the stipulations of the General Regulations, G.54, an appropriate BScHons or equivalent degree is required for admission.

Curriculum: Final year

Core modules

Dissertation 807 (CVD 807) - Credits: 180.00

MSc Applied Science Electrical, Electronic and Computer Engineering (12253073)

Minimum duration of study 1 year

Programme information

The MSc (Applied Science) degree is conferred by the same departments as the BScHons (Applied Science) degree.

A minimum of 128 credits is required to obtain the MSc degree. Either a mini-dissertation (64 credits) and coursework (64 credits) or a dissertation (128 credits) is included in the programme.

Unless the Dean, on recommendation of the relevant head of department, decides otherwise, the master's degree is conferred on the basis of examinations of coursework and a mini-dissertation or a dissertation (including an examination on the dissertation).

Admission requirements

- An appropriate BSc Hons degree (or equivalent). The applicant must have passed this degree with a weighted average of at least 65%.
- The departmental Postgraduate Committee may require additional honours modules for non-degree purposes where background is insufficient.
- The departmental Postgraduate Committee may request evidence of knowledge of research methodology.
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.
- The applicant must determine the research group/focus area and a potential supervisor and confirm the potential supervisor's availability (see departmental website for research groups and heads of research groups). Admission will be granted only if the intended research fits in with the research foci of the Department and the supervision capacity exists, as decided by the Head of the Department.

Curriculum: Final year

Core modules

Dissertation 891 (EER 891) - Credits: 180.00

MSc Applied Science Environmental Technology (12253067)

Minimum duration of study 1 year

Programme information

The MSc (Applied Science) degree is conferred by the same departments as the BScHons (Applied Science) degree.

A minimum of 128 credits is required to obtain the MSc degree. Either a mini-dissertation (64 credits) and coursework (64 credits) or a dissertation (128 credits) is included in the programme.

Unless the Dean, on recommendation of the relevant head of department, decides otherwise, the master's degree is conferred on the basis of examinations of coursework and a mini-dissertation or a dissertation (including an examination on the dissertation).

Admission requirements

- An appropriate BSc Hons degree (or equivalent). The applicant must have passed this degree with a weighted average of at least 65%.
- The departmental Postgraduate Committee may require additional honours modules for non-degree purposes where background is insufficient.
- The departmental Postgraduate Committee may request evidence of knowledge of research methodology.
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.
- The applicant must determine the research group/focus area and a potential supervisor and confirm the potential supervisor's availability (see departmental website for research groups and heads of research groups). Admission will be granted only if the intended research fits in with the research foci of the Department and the supervision capacity exists, as decided by the Head of the Department.

Curriculum: Final year

Core modules

Dissertation 807 (CVD 807) - Credits: 180.00

MSc Applied Science Geotechnics (12253063)

Minimum duration of study 1 year

Programme information

The MSc (Applied Science) degree is conferred by the same departments as the BScHons (Applied Science) degree.

A minimum of 128 credits is required to obtain the MSc degree. Either a mini-dissertation (64 credits) and coursework (64 credits) or a dissertation (128 credits) is included in the programme.

Unless the Dean, on recommendation of the relevant head of department, decides otherwise, the master's degree is conferred on the basis of examinations of coursework and a mini-dissertation or a dissertation (including an examination on the dissertation).

Admission requirements

- An appropriate BSc Hons degree (or equivalent). The applicant must have passed this degree with a weighted average of at least 65%.
- The departmental Postgraduate Committee may require additional honours modules for non-degree purposes where background is insufficient.
- The departmental Postgraduate Committee may request evidence of knowledge of research methodology.
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.
- The applicant must determine the research group/focus area and a potential supervisor and confirm the potential supervisor's availability (see departmental website for research groups and heads of research groups). Admission will be granted only if the intended research fits in with the research foci of the Department and the supervision capacity exists, as decided by the Head of the Department.

Curriculum: Final year

Core modules

Dissertation 890 (SST 890) - Credits: 180.00

MSc Applied Science Industrial Systems (12253060)

Minimum duration of study 1 year

Programme information

The master's degree is conferred on the basis of a dissertation (180 credits).

Admission requirements

- An appropriate BSc Hons degree (or equivalent). The applicant must have passed this degree with a weighted average of at least 65%.
- The departmental Postgraduate Committee may require additional honours modules for non-degree purposes where background is insufficient.
- The departmental Postgraduate Committee may request evidence of knowledge of research methodology.
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.
- The applicant must determine the research group/focus area and a potential supervisor and confirm the potential supervisor's availability (see departmental website for research groups and heads of research groups). Admission will be granted only if the intended research fits in with the research foci of the Department and the supervision capacity exists, as decided by the Head of the Department.

Other programme-specific information

Please refer to the Programme Guide for further information, available [here](#).

Curriculum: Final year

Core modules

Dissertation 891 (BIR 891) - Credits: 180.00

MSc Applied Science Mechanics (12253064)

Minimum duration of study 1 year

Programme information

The MSc (Applied Science) degree is conferred by the same departments as the BScHons (Applied Science) degree.

A minimum of 128 credits is required to obtain the MSc degree. Either a mini-dissertation (64 credits) and coursework (64 credits) or a dissertation (128 credits) is included in the programme.

Unless the Dean, on recommendation of the relevant head of department, decides otherwise, the master's degree is conferred on the basis of examinations of coursework and a mini-dissertation or a dissertation (including an examination on the dissertation).

Admission requirements

- An appropriate BSc Hons degree (or equivalent). The applicant must have passed this degree with a weighted average of at least 65%.
- The departmental Postgraduate Committee may require additional honours modules for non-degree purposes where background is insufficient.
- The departmental Postgraduate Committee may request evidence of knowledge of research methodology.
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.
- The applicant must determine the research group/focus area and a potential supervisor and confirm the potential supervisor's availability (see departmental website for research groups and heads of research groups). Admission will be granted only if the intended research fits in with the research foci of the Department and the supervision capacity exists, as decided by the Head of the Department.

Curriculum: Final year

Core modules

Dissertation 891 (MIR 891) - Credits: 180.00

MSc Applied Science Metallurgy (12253065)

Minimum duration of study 1 year

Programme information

The MSc (Applied Science) degree is conferred by the same departments as the BScHons (Applied Science) degree.

A minimum of 128 credits is required to obtain the MSc degree. Either a mini-dissertation (64 credits) and coursework (64 credits) or a dissertation (128 credits) is included in the programme.

Unless the Dean, on recommendation of the relevant head of department, decides otherwise, the master's degree is conferred on the basis of examinations of coursework and a mini-dissertation or a dissertation (including an examination on the dissertation).

Admission requirements

- An appropriate BSc Hons degree (or equivalent). The applicant must have passed this degree with a weighted average of at least 65%.
- The departmental Postgraduate Committee may require additional honours modules for non-degree purposes where background is insufficient.
- The departmental Postgraduate Committee may request evidence of knowledge of research methodology.
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.
- The applicant must determine the research group/focus area and a potential supervisor and confirm the potential supervisor's availability (see departmental website for research groups and heads of research groups). Admission will be granted only if the intended research fits in with the research foci of the Department and the supervision capacity exists, as decided by the Head of the Department.

Curriculum: Final year

Core modules

[Dissertation 891](#) (NIN 891) - Credits: 180.00

MSc Applied Science Mining (12253072)

Minimum duration of study 1 year

Programme information

The MSc (Applied Science) degree is conferred by the same departments as the BScHons (Applied Science) degree.

A minimum of 128 credits is required to obtain the MSc degree. Either a mini-dissertation (64 credits) and coursework (64 credits) or a dissertation (128 credits) is included in the programme.

Unless the Dean, on recommendation of the relevant head of department, decides otherwise, the master's degree is conferred on the basis of examinations of coursework and a mini-dissertation or a dissertation (including an examination on the dissertation).

Admission requirements

- An appropriate BSc Hons degree (or equivalent). The applicant must have passed this degree with a weighted average of at least 65%.
- The departmental Postgraduate Committee may require additional honours modules for non-degree purposes where background is insufficient.
- The departmental Postgraduate Committee may request evidence of knowledge of research methodology.
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.
- The applicant must determine the research group/focus area and a potential supervisor and confirm the

potential supervisor's availability (see departmental website for research groups and heads of research groups). Admission will be granted only if the intended research fits in with the research foci of the Department and the supervision capacity exists, as decided by the Head of the Department.

Curriculum: Final year

Core modules

Dissertation 891 (PYI 891) - Credits: 180.00

MSc Applied Science Structures (12253071)

Minimum duration of study 1 year

Programme information

The MSc (Applied Science) degree is conferred by the same departments as the BScHons (Applied Science) degree.

A minimum of 128 credits is required to obtain the MSc degree. Either a mini-dissertation (64 credits) and coursework (64 credits) or a dissertation (128 credits) is included in the programme.

Unless the Dean, on recommendation of the relevant head of department, decides otherwise, the master's degree is conferred on the basis of examinations of coursework and a mini-dissertation or a dissertation (including an examination on the dissertation).

Admission requirements

- An appropriate BSc Hons degree (or equivalent). The applicant must have passed this degree with a weighted average of at least 65%.
- The departmental Postgraduate Committee may require additional honours modules for non-degree purposes where background is insufficient.
- The departmental Postgraduate Committee may request evidence of knowledge of research methodology.
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.
- The applicant must determine the research group/focus area and a potential supervisor and confirm the potential supervisor's availability (see departmental website for research groups and heads of research groups). Admission will be granted only if the intended research fits in with the research foci of the Department and the supervision capacity exists, as decided by the Head of the Department.

Curriculum: Final year

Core modules

Dissertation 890 (SST 890) - Credits: 180.00

MSc Applied Science Transportation Planning (12253068)

Minimum duration of study 1 year

Programme information

The MSc (Applied Science) degree is conferred by the same departments as the BScHons (Applied Science) degree.

A minimum of 128 credits is required to obtain the MSc degree. Either a mini-dissertation (64 credits) and coursework (64 credits) or a dissertation (128 credits) is included in the programme.

Unless the Dean, on recommendation of the relevant head of department, decides otherwise, the master's degree is conferred on the basis of examinations of coursework and a mini-dissertation or a dissertation (including an examination on the dissertation).

Admission requirements

- An appropriate BSc Hons degree (or equivalent). The applicant must have passed this degree with a weighted average of at least 65%.
- The departmental Postgraduate Committee may require additional honours modules for non-degree purposes where background is insufficient.
- The departmental Postgraduate Committee may request evidence of knowledge of research methodology.
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.
- The applicant must determine the research group/focus area and a potential supervisor and confirm the potential supervisor's availability (see departmental website for research groups and heads of research groups). Admission will be granted only if the intended research fits in with the research foci of the Department and the supervision capacity exists, as decided by the Head of the Department.

Curriculum: Final year

Core modules

Dissertation 890 (SST 890) - Credits: 180.00

MSc Applied Science Water Resources (12253070)

Minimum duration of study 1 year

Programme information

The MSc (Applied Science) degree is conferred by the same departments as the BScHons (Applied Science) degree.

A minimum of 128 credits is required to obtain the MSc degree. Either a mini-dissertation (64 credits) and coursework (64 credits) or a dissertation (128 credits) is included in the programme.

Unless the Dean, on recommendation of the relevant head of department, decides otherwise, the master's degree is conferred on the basis of examinations of coursework and a mini-dissertation or a dissertation (including an examination on the dissertation).

Admission requirements

- An appropriate BSc Hons degree (or equivalent). The applicant must have passed this degree with a weighted average of at least 65%.
- The departmental Postgraduate Committee may require additional honours modules for non-degree purposes where background is insufficient.

- The departmental Postgraduate Committee may request evidence of knowledge of research methodology.
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.
- The applicant must determine the research group/focus area and a potential supervisor and confirm the potential supervisor's availability (see departmental website for research groups and heads of research groups). Admission will be granted only if the intended research fits in with the research foci of the Department and the supervision capacity exists, as decided by the Head of the Department.

Curriculum: Final year

Core modules

Dissertation 890 (SST 890) - Credits: 180.00

MSc Applied Science Water Utilisation (12253069)

Minimum duration of study 1 year

Programme information

The MSc (Applied Science) degree is conferred by the same departments as the BScHons (Applied Science) degree.

A minimum of 128 credits is required to obtain the MSc degree. Either a mini-dissertation (64 credits) and coursework (64 credits) or a dissertation (128 credits) is included in the programme.

Unless the Dean, on recommendation of the relevant head of department, decides otherwise, the master's degree is conferred on the basis of examinations of coursework and a mini-dissertation or a dissertation (including an examination on the dissertation).

Admission requirements

- An appropriate BSc Hons degree (or equivalent). The applicant must have passed this degree with a weighted average of at least 65%.
- The departmental Postgraduate Committee may require additional honours modules for non-degree purposes where background is insufficient.
- The departmental Postgraduate Committee may request evidence of knowledge of research methodology.
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.
- The applicant must determine the research group/focus area and a potential supervisor and confirm the potential supervisor's availability (see departmental website for research groups and heads of research groups). Admission will be granted only if the intended research fits in with the research foci of the Department and the supervision capacity exists, as decided by the Head of the Department.

Curriculum: Final year

Core modules

Dissertation 807 (CVD 807) - Credits: 180.00

MSc Computer Science (12253074)

Minimum duration of study 1 year

Programme information

The MSc degree is conferred on grounds of a dissertation and such additional postgraduate coursework as may be prescribed. A student is required to demonstrate, by means of a dissertation, the ability to plan, institute and execute a scientific investigation.

A student works under the guidance of a supervisor and is expected to identify and complete a research project. The research results are to be fully reported in an MSc dissertation.

Also consult G Regulations.

Admission requirements

- A BSc Hons degree in Computer Science from the University of Pretoria; or an applicable qualification, and an average of at least 65%.
- The departmental Postgraduate Committee may require additional undergraduate/honours modules for non-degree purposes where background is insufficient.
- The applicant must determine the research group/focus area and a potential supervisor and confirm the potential supervisor's availability (see departmental website for research groups and heads of research groups).

Promotion to next study year

If the supervisor affirms that a candidate has progressed satisfactorily, registration may be renewed for the second year (full-time) or for the second to fourth year (part-time). Re-registration thereafter will only take place if a written motivation from the candidate, supported by the relevant head of department is submitted to the student administration offices.

Research information

Unless Senate, on the recommendation of the supervisor, decides otherwise, a student, before or on submission of a dissertation, must submit proof of submission of an article by an accredited journal to the Head: Student administration.

The draft or submitted article, as the case may be, should be based on the research that the student has conducted for the dissertation/thesis and be approved by the supervisor if the supervisor is not a co-author.

The supervisor shall be responsible for ensuring that the paper is taken through all the processes of revision and resubmission, as may be necessary. Conferment of the degree may be made subject to compliance with the stipulations of this regulation. Also consult the G Regulations.

Pass with distinction

The MSc degree is conferred with distinction on candidates who obtain a final average mark of at least 75%.

Curriculum: Final year

Core modules

Dissertation: Computer science 890 (RKW 890) - Credits: 180.00

MSc Construction Management (12252032)

Minimum duration of study 1 year

Contact Prof BG Zulch benita.zulch@up.ac.za +27 (0)124202851

Programme information

The degree is conferred on the basis of a dissertation and examination on the field of study of the dissertation and/or divisions of the field of study as required by the relevant head of department.

Also refer to G Regulations G.30 to G.40 and G.50 to G.54.

Admission requirements

- A BSc Hons (Construction Management) or equivalent degree at NQF level 8 (including 30 credits of research).
- Relevant practical experience.
- The departmental Postgraduate Committee reserves the right to decide if the applicant is suitable for postgraduate studies based on the academic transcript and required application documentation. The Department only accepts candidates for whom it is able to provide supervision. The applicant must determine the research focus area and a potential supervisor and confirm the potential supervisor's availability (see departmental website for research focus areas, potential supervisors, as well as required application documentation and procedures).

Additional requirements

Supplementary undergraduate modules may be prescribed during the first year of study.

Examinations and pass requirements

The minimum pass mark is 50% for both the dissertation and the examination.

Pass with distinction

The degree is conferred with distinction when a student obtains at least 75% in the examination and the dissertation.

Curriculum: Final year

Core modules

Dissertation: [Construction management 891](#) (KBS 891) - Credits: 180.00

MSc Engineering Management (Coursework) (12251077)

Minimum duration of study 2 years

Programme information

- Unless the Dean, on recommendation of the relevant head of department, decides otherwise, the master's degree is conferred on the basis of examinations of coursework and a mini-dissertation (including an examination on the mini-dissertation).
- A minimum of 180 credits is required to obtain the MSc degree. A mini-dissertation (90 credits) and coursework (90 credits) is included in the programme.
- Recognition is not granted for credits acquired during studying for the BEngHons or the BScHons.

-
- The curriculum is determined in consultation with the relevant head of department. Any specific module is offered on condition that a minimum number of students are registered for the module, as determined by the relevant head of department and the Dean. Students must consult the relevant head of department in order to compile a meaningful programme, as well as for information on the syllabi of the modules. The various departmental postgraduate brochures should also be consulted.

Admission requirements

- A BSc as well as a BSc Honours degree (four study years), in a suitable scientific field and an average of at least 60% calculated on the grades of all the final-year modules, failed and passed. The average of 60% is not applicable if the applicant has already completed another master's degree, or completed the ETM/MOT degree at the University of Pretoria with a minimum average of 55%.
- Three years of relevant post-graduate work experience.
- The Department has limited supervisory capacity and only accepts applicants for whom supervision can be provided. The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript, work experience and to decide if the applicant is suitable for postgraduate studies. Based on this, the three years of work experience may be waived.

Examinations and pass requirements

The stipulations of the relevant Faculty regulations are applicable.

Guidelines for the preparation and examination of mini-dissertations are available from the department.

- i. The examination in each module for which a student is registered, takes place during the normal examination period after the conclusion of lectures (i.e. October/November or May/June).
- ii. A student registered for the masters degree must complete his or her studies within three years provided that the Dean, on recommendation of the relevant head of department, may approve a stipulated limited extension of this period.
- iii. A student must obtain at least 50% in an examination for each module where no semester or year mark is required. A module may only be repeated once.
- iv. In modules where semester or year marks are awarded, a minimum examination mark of 40% and a final mark of 50% is required.
- v. No supplementary or special examinations are granted at postgraduate level.

Research information

A student must by means of a mini-dissertation prove that he or she is capable of planning, instituting and executing a scientific investigation. As part of the examination a student must submit an article and present at the final year symposium. The article should be based on the research that the student has conducted for the dissertation and be approved by the supervisor. Conferment of the degree may be made subject to compliance with the stipulations of this regulation.

Pass with distinction

A student who completes the master's degree on grounds of coursework and a mini-dissertation, passes with distinction if a weighted average mark of at least 75% is obtained in the first 180 credits obtained for the degree provided that 90 of these credits are allocated to the mini-dissertation. However, the degree is not awarded with distinction should a student fail any of these modules (excluding modules which have been timeously discontinued). The degree is also not awarded with distinction if a student obtains less than 70% for the mini-

dissertation. The degree must be completed within the prescribed study period.

Curriculum: Year 1

Core modules

Engineering asset management and maintenance 801 (IAM 801) - Credits: 10.00
Production and operations management 801 (IPP 801) - Credits: 10.00
Mini-dissertation 899 (ISC 899) - Credits: 90.00
Systems engineering and management 801 (ISE 801) - Credits: 10.00
Strategic management 801 (ISM 801) - Credits: 10.00
Technology management 801 (ITB 801) - Credits: 10.00
People management 883 (PEM 883) - Credits: 10.00

Curriculum: Final year

Core modules

Financial management 830 (FBS 830) - Credits: 10.00
Mini-dissertation 899 (ISC 899) - Credits: 90.00

Elective modules

Systems thinking 801 (IBI 801) - Credits: 10.00
Industrial marketing 801 (IIM 801) - Credits: 10.00
Commercialisation and intellectual property 881 (IKG 881) - Credits: 10.00
Quality management 801 (IKK 801) - Credits: 10.00
Knowledge and information management 884 (ILB 884) - Credits: 10.00
Legal aspects 803 (ILC 803) - Credits: 10.00
Sustainability 802 (ILE 802) - Credits: 10.00
Project planning 802 (IMP 802) - Credits: 10.00
New product development 880 (INP 880) - Credits: 10.00
New ventures and entrepreneurship 801 (IOE 801) - Credits: 10.00
Programme and portfolio management 802 (IPM 802) - Credits: 10.00
Risk management 801 (IRI 801) - Credits: 10.00

MSc Project Management (Coursework) (12251078)

Minimum duration of study 2 years

Programme information

- Unless the Dean, on recommendation of the relevant head of department, decides otherwise, the master's degree is conferred on the basis of examinations of coursework and a mini-dissertation (including an examination on the mini-dissertation).
- A minimum of 180 credits is required to obtain the MSc degree. A mini-dissertation (90 credits) and coursework (90 credits) is included in the programme.
- Recognition is not granted for credits acquired during studying for the BEngHons or the BScHons.
- The curriculum is determined in consultation with the relevant head of department. Any specific module is offered on condition that a minimum number of students are registered for the module, as determined by the relevant head of department and the Dean. Students must consult the relevant head of department in order to compile a meaningful programme, as well as for information on the syllabi of the modules. The various

departmental postgraduate brochures should also be consulted.

Admission requirements

- A BSc as well as a BSc Honours degree (four study years), in a suitable scientific field, and an average of at least 60% calculated on the grades of all the final-year modules, failed and passed. The average of 60% is not applicable if the applicant has already completed another master's degree, or completed the ETM/MOT degree at the University of Pretoria with a minimum average of 55%.
- Three years of relevant post-graduate work experience.
- The Department has limited supervisory capacity and only accepts applicants for whom supervision can be provided. The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript, work experience and to decide if the applicant is suitable for postgraduate studies. Based on this, the three years of work experience may be waived.

Other programme-specific information

Details regarding the curricula as well as syllabi of the respective domains are available from the Department.

Examinations and pass requirements

The stipulations of the relevant Faculty regulations are applicable.

Guidelines for the preparation and examination of mini-dissertations are available from the department.

- i. The examination in each module for which a student is registered, takes place during the normal examination period after the conclusion of lectures (i.e. October/November or May/June).
- ii. A student registered for the masters degree must complete his or her studies within three years provided that the Dean, on recommendation of the relevant head of department, may approve a stipulated limited extension of this period.
- iii. A student must obtain at least 50% in an examination for each module where no semester or year mark is required. A module may only be repeated once.
- iv. In modules where semester or year marks are awarded, a minimum examination mark of 40% and a final mark of 50% is required.
- v. No supplementary or special examinations are granted at postgraduate level.

Research information

A student must by means of a mini-dissertation prove that he or she is capable of planning, instituting and executing a scientific investigation. As part of the examination a student must submit an article and present at the final year symposium. The article should be based on the research that the student has conducted for the dissertation and be approved by the supervisor. Conferment of the degree may be made subject to compliance with the stipulations of this regulation.

Pass with distinction

A student who completes the master's degree on grounds of coursework and a mini-dissertation, passes with distinction if a weighted average mark of at least 75% is obtained in the first 180 credits obtained for the degree provided that 90 of these credits are allocated to the mini-dissertation. However, the degree is not awarded with distinction should a student fail any of these modules (excluding modules which have been timeously discontinued). The degree is also not awarded with distinction if a student obtains less than 70% for the mini-dissertation. The degree must be completed within the prescribed study period.

Curriculum: Year 1

Core modules

Project organisation 801 (IHR 801) - Credits: 10.00
Project planning 802 (IMP 802) - Credits: 10.00
Finance and cost management 802 (IPF 802) - Credits: 10.00
Procurement and contract management 801 (IPJ 801) - Credits: 10.00
Information technology and service project management 803 (IPK 803) - Credits: 10.00
Risk management 801 (IRI 801) - Credits: 10.00
Mini-dissertation 899 (ISC 899) - Credits: 90.00
Project systems engineering 802 (ISE 802) - Credits: 10.00
Construction management 803 (KBS 803) - Credits: 10.00

Curriculum: Final year

Core modules

Quality and integration management 801 (IQM 801) - Credits: 10.00
Mini-dissertation 899 (ISC 899) - Credits: 90.00

Elective modules

Systems thinking 801 (IBI 801) - Credits: 10.00
Industrial marketing 801 (IIM 801) - Credits: 10.00
Commercialisation and intellectual property 881 (IKG 881) - Credits: 10.00
Knowledge and information management 884 (ILB 884) - Credits: 10.00
Legal aspects 803 (ILC 803) - Credits: 10.00
Sustainability 802 (ILE 802) - Credits: 10.00
New product development 880 (INP 880) - Credits: 10.00
New ventures and entrepreneurship 801 (IOE 801) - Credits: 10.00
Programme and portfolio management 802 (IPM 802) - Credits: 10.00

MSc Quantity Surveying (12252031)

Minimum duration of study 1 year

Contact Prof BG Zulch benita.zulch@up.ac.za +27 (0)124202851

Programme information

The degree is conferred on the basis of a dissertation and examination on the field of study of the dissertation and/or divisions of the field of study as required by the relevant head of department.

Also refer to G Regulations G.30 to G.40 and G.50 to G.54.

Admission requirements

A BSc Hons (Quantity Surveying) or equivalent degree at NQF level 8 (including 30 credits of research).
Relevant practical experience.

The departmental Postgraduate Committee reserves the right to decide if the applicant is suitable for postgraduate studies based on the academic transcript and required application documentation. The Department only accepts candidates for whom it is able to provide supervision. The applicant must determine the research focus area and a potential supervisor and confirm the potential supervisor's availability (see departmental

website for research focus areas, potential supervisors, as well as required application documentation and procedures).

Additional requirements

Supplementary undergraduate modules may be prescribed during the first year of study.

Examinations and pass requirements

The minimum pass mark is 50% for both the dissertation and the examination.

Pass with distinction

The degree is conferred with distinction when a student obtains at least 75% in the examination and the dissertation.

Curriculum: Final year

Core modules

Dissertation: Quantity surveying 890 (BRK 890) - Credits: 180.00

MSc Real Estate Retail Property (Coursework) (12252037)

Minimum duration of study 2 years

Contact Dr M Burger michelle.burger@up.ac.za +27 (0)124203111

Programme information

The degree can be obtained by successfully completing a curriculum with coursework and a mini-dissertation. The modules are presented in block weeks. The attendance of block weeks is compulsory. All examinations are conducted at the Department of Construction Economics, South Campus, University of Pretoria. The curriculum is compiled in consultation with the relevant head of department. In order to be considered for the MSc Real Estate degree by coursework to be awarded, a candidate should have obtained a minimum of 120 credits for modules and in addition, have submitted and passed an applicable mini-dissertation (60 credits), i.e. a total of 180 credits.

Admission requirements

- A BSc Hons (Real Estate) Retail Property degree; or an applicable university degree at NQF level 8 (including 30 credits of research).
- Relevant practical experience.
- An applicant must submit the following: a sample of academic writing (e.g. research paper or assignment); and a CV with specific reference to research output and publications and a statement on why the applicant is suitable to undertake the research.

Other programme-specific information

The relevant head of department may, at own discretion, allow for any other module that is deemed appropriate for an individual student's circumstances, to be taken elsewhere as elective in lieu of the abovementioned elective modules.

Examinations and pass requirements

A minimum of 40% is required in the examination, with a minimum final mark of 50% to pass.

Examination requirements are set out in the departmental study manuals.

The topic of the mini-dissertation must be approved by the relevant head of department and a minimum of 50% is required to pass.

The degree is conferred with distinction on a student who obtains a weighted average of at least 75% in half of the required modules, at least 75% in the mini-dissertation and a weighted average of at least 65% in the remaining modules, constituting the required credits for the MSc Real Estate degree.

Curriculum: Year 1

Core modules

Shopping centre management 802 (EBS 802) - Credits: 20.00

Property valuation 801 (EDW 801) - Credits: 20.00

Property development 801 (EOW 801) - Credits: 20.00

Shopping centre development 823 (EOW 823) - Credits: 10.00

Research methodology 820 (NNM 820) - Credits: 10.00

Curriculum: Final year

Core modules

Property valuation 802 (EDW 802) - Credits: 20.00

Mini-dissertation: Real estate 892 (EMW 892) - Credits: 60.00

Facilities management 822 (FAM 822) - Credits: 10.00

Property Investment 820 (PMN 820) - Credits: 10.00

MSc Real Estate (12252033)

Minimum duration of study 1 year

Contact Prof BG Zulch benita.zulch@up.ac.za +27 (0)124202851

Programme information

The degree is conferred on the basis of a dissertation and examination on the field of study of the dissertation and/or divisions of the field of study as required by the relevant head of department.

Also refer to G Regulations G.30 to G.40 and G.50 to G.54.

Admission requirements

- A BSc Hons (Real Estate) or equivalent degree at NQF
- level 8 (including 30 credits of research).
- Relevant practical experience.
- The departmental Postgraduate Committee reserves the right to decide if the applicant is suitable for postgraduate studies based on the academic transcript and required application documentation. The Department only accepts candidates for whom it is able to provide supervision. The applicant must determine the research focus area and a potential supervisor and confirm the potential supervisor's availability (see departmental website for research focus areas, potential supervisors, as well as required application documentation and procedures).

Examinations and pass requirements

The minimum pass mark is 50% for both the dissertation and the examination.

Pass with distinction

The degree is conferred with distinction when a student obtains at least 75% in the examination and the dissertation.

Curriculum: Final year

Core modules

Dissertation: Real estate 890 (EMW 890) - Credits: 180.00

MSc Real Estate (Coursework) (12252034)

Minimum duration of study 2 years

Contact Dr M Burger michelle.burger@up.ac.za +27 (0)124203111

Programme information

The degree can be obtained by successfully completing a curriculum with coursework and a mini-dissertation.

The modules are presented in block weeks. The attendance of block weeks is compulsory. All examinations are conducted at the Department of Construction Economics, South Campus, University of Pretoria.

The curriculum is compiled in consultation with the Head of Department. In order to be considered for the MSc Real Estate degree by coursework to be awarded, a candidate should have obtained a minimum of 120 credits for modules and in addition, have submitted and passed an applicable mini-dissertation (60 credits), i.e. a total of 180 credits.

Admission requirements

- A BSc Hons (Real Estate) Retail Property degree; or an applicable university degree at NQF level 8 (including 30 credits of research).
- Relevant practical experience.
- An applicant must submit the following: a sample of academic writing (e.g. research paper or assignment); and a CV with specific reference to research output and publications and a statement on why the applicant is suitable to undertake the research.

Other programme-specific information

The Head of Department may, at own discretion, allow for any other module that is deemed appropriate for an individual student's circumstances, to be taken elsewhere as elective in lieu of the abovementioned elective modules.

Examinations and pass requirements

- a. A minimum of 40% is required in the examination, with a minimum final mark of 50% to pass.
- b. Examination requirements are set out in the departmental study manuals.
- c. The topic of the mini-dissertation must be approved by the Head of Department and a minimum of 50% is required to pass.
- d. The degree is conferred with distinction on a student who obtains a weighted average of at least 75% in half

of the required modules, at least 75% in the mini-dissertation and a weighted average of at least 65% in the remaining modules, constituting the required credits for the MSc Real Estate degree.

Curriculum: Year 1

Core modules

Property management 801 (EBS 801) - Credits: 20.00
Property valuation 801 (EDW 801) - Credits: 20.00
Property development 801 (EOW 801) - Credits: 20.00
Property development 822 (EOW 822) - Credits: 10.00
Research methodology 820 (NNM 820) - Credits: 10.00

Curriculum: Final year

Core modules

Property valuation 802 (EDW 802) - Credits: 20.00
Mini-dissertation: Real estate 892 (EMW 892) - Credits: 60.00
Facilities management 822 (FAM 822) - Credits: 10.00
Property Investment 820 (PMN 820) - Credits: 10.00

MSc Technology and Innovation Management (Coursework) (12251079)

Minimum duration of study 2 years

Programme information

- Unless the Dean, on recommendation of the relevant head of department, decides otherwise, the master's degree is conferred on the basis of examinations of coursework and a mini-dissertation (including an examination on the mini-dissertation).
- A minimum of 180 credits is required to obtain the MSc degree. A mini-dissertation (90 credits) and coursework (90 credits) is included in the programme.
- Recognition is not granted for credits acquired during studying for the BEngHons or the BScHons.
- The curriculum is determined in consultation with the relevant head of department. Any specific module is offered on condition that a minimum number of students are registered for the module, as determined by the relevant head of department and the Dean. Students must consult the relevant head of department in order to compile a meaningful programme, as well as for information on the syllabi of the modules. The various departmental postgraduate brochures should also be consulted.

Admission requirements

- A BSc as well as a BSc Hons degree (four study years), in a suitable scientific field, and an average of at least 60% calculated on the grades of all the final-year modules, failed and passed. The average of 60% is not applicable if the applicant has already completed another master's degree, or completed the ETM/MOT degree at the University of Pretoria with a minimum average of 55%.
- Three years of relevant post-graduate work experience.
- The Department has limited supervisory capacity and only accepts applicants for whom supervision can be provided. The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript, work experience and to decide if the applicant is suitable for postgraduate studies. Based on this, the three years of work experience may be waived.

Examinations and pass requirements

The stipulations of the relevant Faculty regulations are applicable.

Guidelines for the preparation and examination of mini-dissertations are available from the department.

- i. The examination in each module for which a student is registered, takes place during the normal examination period after the conclusion of lectures (i.e. October/November or May/June).
- ii. A student registered for the masters degree must complete his or her studies within three years provided that the Dean, on recommendation of the relevant head of department, may approve a stipulated limited extension of this period.
- iii. A student must obtain at least 50% in an examination for each module where no semester or year mark is required. A module may only be repeated once.
- iv. In modules where semester or year marks are awarded, a minimum examination mark of 40% and a final mark of 50% is required.
- v. No supplementary or special examinations are granted at postgraduate level.

Research information

A student must by means of a mini-dissertation prove that he or she is capable of planning, instituting and executing a scientific investigation. As part of the examination a student must submit an article and present at the final year symposium. The article should be based on the research that the student has conducted for the dissertation and be approved by the supervisor. Conferment of the degree may be made subject to compliance with the stipulations of this regulation.

Pass with distinction

A student who completes the master's degree on grounds of coursework and a mini-dissertation, passes with distinction if a weighted average mark of at least 75% is obtained in the first 180 credits obtained for the degree provided that 90 of these credits are allocated to the mini-dissertation. However, the degree is not awarded with distinction should a student fail any of these modules (excluding modules which have been timeously discontinued). The degree is also not awarded with distinction if a student obtains less than 70% for the mini-dissertation. The degree must be completed within the prescribed study period.

Curriculum: Year 1

Core modules

Corporate entrepreneurship 880 (IEE 880) - Credits: 10.00

New product development 880 (INP 880) - Credits: 10.00

Organisation and innovation 880 (INV 880) - Credits: 10.00

Mini-dissertation 899 (ISC 899) - Credits: 90.00

Science, technology and innovation policy 880 (ISP 880) - Credits: 10.00

Strategic technology and innovation management 880 (IST 880) - Credits: 10.00

Fundamentals of technology management 802 (ITB 802) - Credits: 10.00

Curriculum: Final year

Core modules

Project economics 880 (IBD 880) - Credits: 10.00

Mini-dissertation 899 (ISC 899) - Credits: 90.00

Elective modules

Systems thinking 801 (IBI 801) - Credits: 10.00
Industrial marketing 801 (IIM 801) - Credits: 10.00
Commercialisation and intellectual property 881 (IKG 881) - Credits: 10.00
Quality management 801 (IKK 801) - Credits: 10.00
Knowledge and information management 884 (ILB 884) - Credits: 10.00
Legal aspects 803 (ILC 803) - Credits: 10.00
Sustainability 802 (ILE 802) - Credits: 10.00
Project planning 802 (IMP 802) - Credits: 10.00
New ventures and entrepreneurship 801 (IOE 801) - Credits: 10.00
Programme and portfolio management 802 (IPM 802) - Credits: 10.00
Risk management 801 (IRI 801) - Credits: 10.00

MTRP (12252035)

Minimum duration of study 1 year

Programme information

The Master's degree [MT&RP] is conferred by virtue of a dissertation as well as related assignments as prescribed by the relevant head of department including an academic article for publication and an examination in the field of the dissertation and/or sections thereof as required by the relevant head of department/supervisor.

The successful completion of a relevant module in research methodology is a prerequisite for approval of the study proposal.

Refer to the G Regulations G.30 to G.44 and G.57 to G.62.

Admission requirements

- A BTown and Regional Planning (BTRP) degree of the University of Pretoria; or an honours degree in planning or a relevant field (such as architecture, civil engineering, construction, economics, geography, or sociology, or any other field deemed acceptable by the departmental Postgraduate Committee.
- The departmental Postgraduate Committee may request evidence of knowledge of research methodology and practical experience and reserves the right to decide if the applicant is suitable for postgraduate studies based on the academic transcript and required application documentation. The Department only accepts candidates for whom it is able to provide supervision. The applicant must determine the research focus area and a potential supervisor and confirm the potential supervisor's availability (see departmental website for research focus areas, potential supervisors, as well as required application documentation and procedures).

Additional requirements

Supplementary undergraduate modules for the MT&RP degree may be prescribed for students who have not obtained a BT&RP degree.

Examinations and pass requirements

The minimum pass mark is 50% in both the dissertation and examination.

Pass with distinction

The degree is conferred with distinction on a student who obtains at least 75% in both the examination and dissertation.

Curriculum: Final year

Core modules

Dissertation: Town and regional planning 890 (SSB 890) - Credits: 180.00

MTRP (Coursework) (12252036)

Minimum duration of study 2 years

Programme information

This master's degree is obtained by virtue of coursework and a mini-dissertation. The topic of the mini-dissertation must be approved by the relevant head of department.

Admission requirements

- A BTown and Regional Planning (BTRP) degree of the University of Pretoria or an honours degree in planning or a relevant field (such as architecture, civil engineering, construction, economics, geography, or sociology, or any other field deemed acceptable by the departmental Postgraduate Committee.
- The departmental Postgraduate Committee may require practical experience, and reserves the right to make a thorough assessment of the applicant's academic transcript and to decide if the applicant is suitable for postgraduate studies.
- The applicant must determine the research group/focus area and a potential supervisor and confirm the potential supervisor's availability (see departmental website for research groups and heads of research groups).

Additional requirements

Supplementary undergraduate modules for the MT&RP degree may be prescribed for students who have not obtained a BT&RP degree.

Examinations and pass requirements

A minimum semester/year mark of 40% is required in order to be admitted to the final examination in a specific module. In addition, all other examination admission requirements, applicable to the relevant module, must be met. A minimum pass mark of 40% is required in the examination, with a minimum final mark of 50% to pass.

Pass with distinction

The degree is conferred with distinction on a student who obtains a weighted average of at least 75% in the examinations of all the prescribed core modules as well as the mini-dissertation.

Curriculum: Year 1

Core modules

Integrated development planning 820 (TPD 820) - Credits: 20.00

Metropolitan and urban area-based interventions 811 (TPI 811) - Credits: 20.00

Regional interventions 821 (TPI 821) - Credits: 20.00
Sustainable settlement planning and design 810 (TPS 810) - Credits: 20.00
Introduction to urban design 820 (TPS 820) - Credits: 20.00
An overview of planning theory and practice 810 (TRP 810) - Credits: 20.00

Curriculum: Final year

Core modules

Research methodology 810 (TPE 810) - Credits: 20.00
Mini-dissertation 820 (TPE 820) - Credits: 60.00
Land use management and land development 810 (TPU 810) - Credits: 20.00
Institutional and legal structures for planning 810 (TPW 810) - Credits: 20.00

Doctorate

PhD Architecture (12262004)

Minimum duration of study 2 years

Contact	Dr N Botes	nico.botes@up.ac.za	+27 (0)124204600
	Prof AAJ Barker	arthur.barker@up.ac.za	+27 (0)124204542

Programme information

A PhD student must submit a thesis which deals with a topic from the discipline of architecture and which provides proof of advanced original research and/or creative work which makes a real and substantial contribution to the knowledge and/or practice of architecture.

A student must submit at least one draft article to a recognised journal for publication, before or concurrent with the submission of the thesis. The draft article must be based on the research undertaken for the thesis and must be acceptable to the supervisor.

Also refer to General Regulations G.42 to G.54.

Admission requirements

- A master's degree in Architecture or an associated field (such as urban design, civil engineering, planning, construction, geography, visual arts, sociology, or any other field deemed acceptable by the departmental Postgraduate Committee).
- The departmental Postgraduate Committee reserves the right to decide if the applicant is suitable for postgraduate studies based on the academic transcript and required application documentation. The Department has limited supervisory capacity and only accepts candidates for whom it is able to provide supervision. The applicant must intend to do research in the domain of architecture and urbanism, must determine the research focus area and a potential supervisor and confirm the potential supervisor's availability (consult departmental website for research focus areas, potential supervisors, as well as required application documentation and procedures).
- An applicant in possession of a master's degree by coursework may be requested by the departmental Postgraduate Committee to complete a research methodology course prior to commencing studies.

Additional requirements

Candidates in possession of a master's degree by coursework may, at the discretion of the relevant head of department, be required to pass supplementary modules prior to commencing of studies.

Examinations and pass requirements

The doctoral examination, either written or oral, **is compulsory**, and covers the content of the thesis as well as the field of study on which the thesis is based.

Curriculum: Year 1

Core modules

Thesis: Architecture 990 (ARG 990) - Credits: 360.00

Curriculum: Final year

Core modules

Thesis: Architecture 990 (ARG 990) - Credits: 360.00

PhD Biosystems (12263203)

Minimum duration of study 2 years

Admission requirements

- An appropriate research-based master's degree
- The departmental Postgraduate Committee may require additional honours modules for non-degree purposes where background is insufficient.
- All applicants from other universities must submit a copy of the master's dissertation in PDF format and a list of published journal articles (if any).
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.
- A research concept may be required; see departmental brochure.
- The applicant must determine the research group/focus area and a potential supervisor and confirm the potential supervisor's availability (see departmental website for research groups and heads of research groups). Admission will be granted only if the intended research fits in with the research foci of the Department and the supervision capacity exists, as decided by the Head of the Department.

Other programme-specific information

Also consult the General Regulations.

- a. Subject to the stipulations of the General Regulations, a master's degree is required for admission to studies for a PhD.
- b. Unless otherwise decided by the Dean, on the recommendation of the supervisor, the PhD degree is awarded on the basis of a thesis and an examination on the thesis.
- c. Unless the Senate, on the recommendation of the supervisor, decides otherwise, a student, before or on submission of a thesis, must submit proof of submission of an article issued by an accredited journal, to the Head: Student Administration. The submitted article should be based on the research that the student has conducted for the thesis and be approved by the supervisor if the supervisor is not a co-author. The supervisor shall be responsible for ensuring that the paper is taken through all the processes of revision and resubmission, as may be necessary. Conferment of the degree may be made subject to compliance with the stipulations of this regulation.
- d. The student must provide proof by means of his work, thesis and examination of advanced original research and/or creative work which makes a real and substantial contribution to the knowledge of Engineering Science and/or Practice.

Curriculum: Year 1

Core modules

Thesis: Biosystems 990 (EIC 990) - Credits: 360.00

Curriculum: Final year

Core modules

Thesis: Biosystems 990 (EIC 990) - Credits: 360.00

PhD Chemical Engineering (12263012)

Minimum duration of study 2 years

Admission requirements

- A MEng degree awarded by the University of Pretoria or researched-based master's degree in engineering awarded by another university.
- The applicant must also meet the admission requirements for the BEng Hons degree.
- The departmental Postgraduate Committee may require additional honours modules for non-degree purposes where background is insufficient.
- All applicants from other universities must submit a copy of the master's dissertation in PDF format and a list of published journal articles (if any).
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.
- A research concept may be required; see departmental brochure.
- The applicant must determine the research group/focus area and a potential supervisor and confirm the potential supervisor's availability (see departmental website for research groups and heads of research groups). Admission will be granted only if the intended research fits in with the research foci of the Department and the supervision capacity exists, as decided by the Head of the Department.

Other programme-specific information

Also consult the General Regulations.

- a. Subject to the stipulations of the General Regulations, no candidate is admitted to doctoral studies unless such a candidate holds a master's degree in Engineering or an equivalent master's degree.
- b. Unless otherwise decided by the Dean, on the recommendation of the supervisor, the PhD (Engineering) degree is awarded on the basis of a thesis and an examination on the thesis.
- c. Unless Senate, on the recommendation of the supervisor, decides otherwise, a student, before or on submission of a thesis, must submit proof of submission of an article from/issued by an accredited journal, to the Head: Student Administration. The submitted article should be based on the research that the student has conducted for the thesis and be approved by the supervisor if the supervisor is not a co-author. The supervisor shall be responsible for ensuring that the paper is taken through all the processes of revision and resubmission, as may be necessary. Conferment of the degree may be made subject to compliance with the stipulations of this regulation.
- d. The student must provide proof by means of his work, thesis and examination of advanced original research and/or creative work which makes a real and substantial contribution to the knowledge of engineering science and/or practice.

Curriculum: Year 1

Core modules

Thesis: Chemical engineering 990 (CIR 990) - Credits: 360.00

Curriculum: Final year

Core modules

Thesis: Chemical engineering 990 (CIR 990) - Credits: 360.00

PhD Chemical Technology (12263142)

Minimum duration of study 2 years

Admission requirements

- An appropriate research-based master's degree
- The departmental Postgraduate Committee may require additional honours modules for non-degree purposes where background is insufficient.
- All applicants from other universities must submit a copy of the master's dissertation in PDF format and a list of published journal articles (if any).
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.
- A research concept may be required; see departmental brochure.
- The applicant must determine the research group/focus area and a potential supervisor and confirm the potential supervisor's availability (see departmental website for research groups and heads of research groups). Admission will be granted only if the intended research fits in with the research foci of the Department and the supervision capacity exists, as decided by the Head of the Department.

Other programme-specific information

Also consult the General Regulations.

- a. Subject to the stipulations of the General Regulations, a master's degree is required for admission to studies for a PhD.
- b. Unless otherwise decided by the Dean, on the recommendation of the supervisor, the PhD degree is awarded on the basis of a thesis and an examination on the thesis.
- c. Unless the Senate, on the recommendation of the supervisor, decides otherwise, a student, before or on submission of a thesis, must submit proof of submission of an article issued by an accredited journal, to the Head: Student Administration. The submitted article should be based on the research that the student has conducted for the thesis and be approved by the supervisor if the supervisor is not a co-author. The supervisor shall be responsible for ensuring that the paper is taken through all the processes of revision and resubmission, as may be necessary. Conferment of the degree may be made subject to compliance with the stipulations of this regulation.
- d. The student must provide proof by means of his work, thesis and examination of advanced original research and/or creative work which makes a real and substantial contribution to the knowledge of Engineering Science and/or Practice.

Curriculum: Year 1

Core modules

Thesis: Chemical technology 990 (CCT 990) - Credits: 360.00

Curriculum: Final year

Core modules

Thesis: Chemical technology 990 (CCT 990) - Credits: 360.00

PhD Civil (12263222)

Minimum duration of study 2 years

Admission requirements

- An appropriate research-based master's degree
- The departmental Postgraduate Committee may require additional honours modules for non-degree purposes where background is insufficient.
- All applicants from other universities must submit a copy of the master's dissertation in PDF format and a list of published journal articles (if any).
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.
- A research concept may be required; see departmental brochure.
- The applicant must determine the research group/focus area and a potential supervisor and confirm the potential supervisor's availability (see departmental website for research groups and heads of research groups). Admission will be granted only if the intended research fits in with the research foci of the Department and the supervision capacity exists, as decided by the Head of the Department.

Other programme-specific information

Also consult the General Regulations.

- a. Subject to the stipulations of the General Regulations, a master's degree is required for admission to studies for a PhD.
- b. Unless otherwise decided by the Dean, on the recommendation of the supervisor, the PhD degree is awarded on the basis of a thesis and an examination on the thesis.
- c. Unless the Senate, on the recommendation of the supervisor, decides otherwise, a student, before or on submission of a thesis, must submit proof of submission of an article issued by an accredited journal, to the Head: Student Administration. The submitted article should be based on the research that the student has conducted for the thesis and be approved by the supervisor if the supervisor is not a co-author. The supervisor shall be responsible for ensuring that the paper is taken through all the processes of revision and resubmission, as may be necessary. Conferment of the degree may be made subject to compliance with the stipulations of this regulation.
- d. The student must provide proof by means of his work, thesis and examination of advanced original research and/or creative work which makes a real and substantial contribution to the knowledge of Engineering Science and/or Practice.

Curriculum: Year 1

Core modules

Thesis: Civil engineering 990 (SIR 990) - Credits: 360.00

Curriculum: Final year

Core modules

Thesis: Civil engineering 990 (SIR 990) - Credits: 360.00

PhD Civil Engineering (12263072)

Minimum duration of study 2 years

Admission requirements

- A MEng degree awarded by the University of Pretoria or researched-based master's degree in engineering awarded by another university.
- The applicant must also meet the admission requirements for the BEng Hons degree.
- The departmental Postgraduate Committee may require additional honours modules for non-degree purposes where background is insufficient.
- All applicants from other universities must submit a copy of the master's dissertation in PDF format and a list of published journal articles (if any).
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.
- A research concept may be required; see departmental brochure.
- The applicant must determine the research group/focus area and a potential supervisor and confirm the potential supervisor's availability (see departmental website for research groups and heads of research groups). Admission will be granted only if the intended research fits in with the research foci of the Department and the supervision capacity exists, as decided by the Head of the Department.

Other programme-specific information

Also consult the General Regulations.

- a. Subject to the stipulations of the General Regulations, a master's degree is required for admission to studies for a PhD.
- b. Unless otherwise decided by the Dean, on the recommendation of the supervisor, the PhD degree is awarded on the basis of a thesis and an examination on the thesis.
- c. Unless the Senate, on the recommendation of the supervisor, decides otherwise, a student, before or on submission of a thesis, must submit proof of submission of an article issued by an accredited journal, to the Head: Student Administration. The submitted article should be based on the research that the student has conducted for the thesis and be approved by the supervisor if the supervisor is not a co-author. The supervisor shall be responsible for ensuring that the paper is taken through all the processes of revision and resubmission, as may be necessary. Conferment of the degree may be made subject to compliance with the stipulations of this regulation.
- d. The student must provide proof by means of his work, thesis and examination of advanced original research and/or creative work which makes a real and substantial contribution to the knowledge of Engineering Science and/or Practice.

Curriculum: Year 1

Core modules

Thesis: Civil engineering 990 (SIR 990) - Credits: 360.00

Curriculum: Final year

Core modules

Thesis: Civil engineering 990 (SIR 990) - Credits: 360.00

PhD Computer Engineering (12263104)

Minimum duration of study 2 years

Admission requirements

- A MEng degree awarded by the University of Pretoria or researched-based master's degree in engineering awarded by another university.
- The applicant must also meet the admission requirements for the BEng Hons degree.
- The departmental Postgraduate Committee may require additional honours modules for non-degree purposes where background is insufficient.
- All applicants from other universities must submit a copy of the master's dissertation in PDF format and a list of published journal articles (if any).
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.
- A research concept may be required; see departmental brochure.
- The applicant must determine the research group/focus area and a potential supervisor and confirm the potential supervisor's availability (see departmental website for research groups and heads of research groups). Admission will be granted only if the intended research fits in with the research foci of the Department and the supervision capacity exists, as decided by the Head of the Department.

Other programme-specific information

Also consult the General Regulations.

- a. Subject to the stipulations of the General Regulations, a master's degree is required for admission to studies for a PhD.
- b. Unless otherwise decided by the Dean, on the recommendation of the supervisor, the PhD degree is awarded on the basis of a thesis and an examination on the thesis.
- c. Unless the Senate, on the recommendation of the supervisor, decides otherwise, a student, before or on submission of a thesis, must submit proof of submission of an article issued by an accredited journal, to the Head: Student Administration. The submitted article should be based on the research that the student has conducted for the thesis and be approved by the supervisor if the supervisor is not a co-author. The supervisor shall be responsible for ensuring that the paper is taken through all the processes of revision and resubmission, as may be necessary. Conferment of the degree may be made subject to compliance with the stipulations of this regulation.
- d. The student must provide proof by means of his work, thesis and examination of advanced original research and/or creative work which makes a real and substantial contribution to the knowledge of Engineering Science and/or Practice.

Curriculum: Year 1

Core modules

Thesis: Computer engineering 990 (ERI 990) - Credits: 360.00

Curriculum: Final year

Core modules

Thesis: Computer engineering 990 (ERI 990) - Credits: 360.00

PhD Computer Science (12266001)

Minimum duration of study 2 years

Programme information

The department offers a research-based PhD degree. The student works under guidance of a supervisor and is expected to identify and complete a research project. The research results are to be fully reported in a PhD thesis. Unless otherwise decided by the Dean, on the recommendation of the supervisor, the PhD(Computer Science) degree is awarded on the basis of a thesis and an examination on the thesis.

Also consult G Regulations

Admission requirements

- An MSc (Computer Science) or an equivalent degree, as well as a mark of at least 70% obtained for the master's dissertation or equivalent degree.
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and to decide if the applicant is suitable for postgraduate studies. The applicant must determine the research group/focus area and a potential supervisor and confirm the potential supervisor's availability (see departmental website for research groups and heads of research groups), and must be approved by the departmental Postgraduate Committee.

Examinations and pass requirements

The thesis and examination thereof should prove that the candidate has carried out advanced original research and/or creative work, which make a real and substantial contribution to the discipline of computer science.

Research information

Unless Senate, on the recommendation of the supervisor, decides otherwise, a student, before or on submission of a thesis, must submit proof of submission of an article by an accredited journal to the Head: Student Administration.

The draft or submitted article, as the case may be, should be based on the research that the student has conducted for the dissertation/thesis and be approved by the supervisor if the supervisor is not a co-author.

The supervisor shall be responsible for ensuring that the paper is taken through all the processes of revision and resubmission, as may be necessary. Conferment of the degree may be made subject to compliance with the stipulations of this regulation.

Curriculum: Year 1

Core modules

Thesis: Computer science 990 (RKW 990) - Credits: 360.00

Curriculum: Final year

Core modules

Thesis: Computer science 990 (RKW 990) - Credits: 360.00

PhD Construction Management (12262018)

Minimum duration of study 2 years

Contact Prof BG Zulch benita.zulch@up.ac.za +27 (0)124202851

Programme information

A PhD student must submit a thesis which deals with a topic from the list of subject disciplines.

Admission requirements

- A master's degree in Construction Management or an associated field (such as quantity surveying, real estate, civil engineering, architecture, or any other field deemed acceptable by the Departmental Postgraduate Committee); or an MBA/MBL degree for applicants with an honours degree in either quantity surveying, construction management or real estate.
- The departmental Postgraduate Committee reserves the right to decide if the applicant is suitable for postgraduate studies based on the academic transcript and required application documentation. The Department has limited supervisory capacity and only accepts candidates for whom it is able to provide supervision. The applicant must intend to do research in the domain of construction management, must determine the research focus area and a potential supervisor and confirm the potential supervisor's availability (consult departmental website for research focus areas, potential supervisors, as well as required application documentation and procedures).
- An applicant in possession of a master's degree by coursework may be requested by the departmental Postgraduate Committee to complete a research methodology course prior to commencing studies.

Examinations and pass requirements

The doctoral examination, either written or oral, is compulsory, and covers the content of the thesis as well as the sections of the field of study on which the thesis is based.

Curriculum: Year 1

Core modules

Thesis: Construction management 990 (KBS 990) - Credits: 360.00

Curriculum: Final year

Core modules

Thesis: Construction management 990 (KBS 990) - Credits: 360.00

PhD Electric (12263152)

Minimum duration of study 2 years

Admission requirements

- An appropriate research-based master's degree
- The departmental Postgraduate Committee may require additional honours modules for non-degree purposes where background is insufficient.
- All applicants from other universities must submit a copy of the master's dissertation in PDF format and a list of published journal articles (if any).
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.
- A research concept may be required; see departmental brochure.
- The applicant must determine the research group/focus area and a potential supervisor and confirm the potential supervisor's availability (see departmental website for research groups and heads of research groups). Admission will be granted only if the intended research fits in with the research foci of the Department and the supervision capacity exists, as decided by the Head of the Department.

Other programme-specific information

Also consult the General Regulations.

- a. Subject to the stipulations of the General Regulations, a master's degree is required for admission to studies for a PhD.
- b. Unless otherwise decided by the Dean, on the recommendation of the supervisor, the PhD degree is awarded on the basis of a thesis and an examination on the thesis.
- c. Unless the Senate, on the recommendation of the supervisor, decides otherwise, a student, before or on submission of a thesis, must submit proof of submission of an article issued by an accredited journal, to the Head: Student Administration. The submitted article should be based on the research that the student has conducted for the thesis and be approved by the supervisor if the supervisor is not a co-author. The supervisor shall be responsible for ensuring that the paper is taken through all the processes of revision and resubmission, as may be necessary. Conferment of the degree may be made subject to compliance with the stipulations of this regulation.
- d. The student must provide proof by means of his work, thesis and examination of advanced original research and/or creative work which makes a real and substantial contribution to the knowledge of Engineering Science and/or Practice.

Curriculum: Year 1

Core modules

Thesis: Electrical 991 (EIR 991) - Credits: 360.00

Curriculum: Final year

Core modules

Thesis: Electrical 991 (EIR 991) - Credits: 360.00

PhD Electrical Engineering (12263022)

Minimum duration of study 2 years

Admission requirements

- A MEng degree awarded by the University of Pretoria or researched-based master's degree in engineering awarded by another university.
- The applicant must also meet the admission requirements for the BEng Hons degree.
- The departmental Postgraduate Committee may require additional honours modules for non-degree purposes where background is insufficient.
- All applicants from other universities must submit a copy of the master's dissertation in PDF format and a list of published journal articles (if any).
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.
- A research concept may be required; see departmental brochure.
- The applicant must determine the research group/focus area and a potential supervisor and confirm the potential supervisor's availability (see departmental website for research groups and heads of research groups). Admission will be granted only if the intended research fits in with the research foci of the Department and the supervision capacity exists, as decided by the Head of the Department.
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Other programme-specific information

Also consult the General Regulations.

- a. Subject to the stipulations of the General Regulations, no candidate is admitted to doctoral studies unless such a candidate holds a master's degree in Engineering or an equivalent master's degree.
- b. Unless otherwise decided by the Dean, on the recommendation of the supervisor, the PhD (Engineering) degree is awarded on the basis of a thesis and an examination on the thesis.
- c. Unless Senate, on the recommendation of the supervisor, decides otherwise, a student, before or on submission of a thesis, must submit proof of submission of an article from/issued by an accredited journal, to the Head: Student Administration. The submitted article should be based on the research that the student has conducted for the thesis and be approved by the supervisor if the supervisor is not a co-author. The supervisor shall be responsible for ensuring that the paper is taken through all the processes of revision and resubmission, as may be necessary. Conferment of the degree may be made subject to compliance with the stipulations of this regulation.
- d. The student must provide proof by means of his work, thesis and examination of advanced original research and/or creative work which makes a real and substantial contribution to the knowledge of engineering science and/or practice.

Curriculum: Year 1

Core modules

Thesis: Electrical engineering 990 (EIR 990) - Credits: 360.00

Curriculum: Final year

Core modules

Thesis: Electrical engineering 990 (EIR 990) - Credits: 360.00

PhD Electronic Engineering (12263082)

Minimum duration of study 2 years

Admission requirements

- A MEng degree awarded by the University of Pretoria or researched-based master's degree in engineering awarded by another university.
- The applicant must also meet the admission requirements for the BEng Hons degree.
- The departmental Postgraduate Committee may require additional honours modules for non-degree purposes where background is insufficient.
- All applicants from other universities must submit a copy of the master's dissertation in PDF format and a list of published journal articles (if any).
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.
- A research concept may be required; see departmental brochure.
- The applicant must determine the research group/focus area and a potential supervisor and confirm the potential supervisor's availability (see departmental website for research groups and heads of research groups). Admission will be granted only if the intended research fits in with the research foci of the Department and the supervision capacity exists, as decided by the Head of the Department.

Other programme-specific information

Also consult the General Regulations.

- a. Subject to the stipulations of the General Regulations, a master's degree is required for admission to studies for a PhD.
- b. Unless otherwise decided by the Dean, on the recommendation of the supervisor, the PhD degree is awarded on the basis of a thesis and an examination on the thesis.
- c. Unless the Senate, on the recommendation of the supervisor, decides otherwise, a student, before or on submission of a thesis, must submit proof of submission of an article issued by an accredited journal, to the Head: Student Administration. The submitted article should be based on the research that the student has conducted for the thesis and be approved by the supervisor if the supervisor is not a co-author. The supervisor shall be responsible for ensuring that the paper is taken through all the processes of revision and resubmission, as may be necessary. Conferment of the degree may be made subject to compliance with the stipulations of this regulation.
- d. The student must provide proof by means of his work, thesis and examination of advanced original research and/or creative work which makes a real and substantial contribution to the knowledge of Engineering Science and/or Practice.

Curriculum: Year 1

Core modules

Thesis: Electronic engineering 990 (EIN 990) - Credits: 360.00

Curriculum: Final year

Core modules

Thesis: Electronic engineering 990 (EIN 990) - Credits: 360.00

PhD Electronics (12263162)

Minimum duration of study 2 years

Admission requirements

- An appropriate research-based master's degree
- The departmental Postgraduate Committee may require additional honours modules for non-degree purposes where background is insufficient.
- All applicants from other universities must submit a copy of the master's dissertation in PDF format and a list of published journal articles (if any).
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.
- A research concept may be required; see departmental brochure.
- The applicant must determine the research group/focus area and a potential supervisor and confirm the potential supervisor's availability (see departmental website for research groups and heads of research groups). Admission will be granted only if the intended research fits in with the research foci of the Department and the supervision capacity exists, as decided by the Head of the Department.

Other programme-specific information

Also consult the General Regulations.

- a. Subject to the stipulations of the General Regulations, a master's degree is required for admission to studies for a PhD.
- b. Unless otherwise decided by the Dean, on the recommendation of the supervisor, the PhD degree is awarded on the basis of a thesis and an examination on the thesis.
- c. Unless the Senate, on the recommendation of the supervisor, decides otherwise, a student, before or on submission of a thesis, must submit proof of submission of an article issued by an accredited journal, to the Head: Student Administration. The submitted article should be based on the research that the student has conducted for the thesis and be approved by the supervisor if the supervisor is not a co-author. The supervisor shall be responsible for ensuring that the paper is taken through all the processes of revision and resubmission, as may be necessary. Conferment of the degree may be made subject to compliance with the stipulations of this regulation.
- d. The student must provide proof by means of his work, thesis and examination of advanced original research and/or creative work which makes a real and substantial contribution to the knowledge of Engineering Science and/or Practice.

Curriculum: Year 1

Core modules

Thesis: [Electronics 991](#) (EIN 991) - Credits: 360.00

Curriculum: Final year

Core modules

Thesis: [Electronics 991](#) (EIN 991) - Credits: 360.00

PhD Engineering Management (12261072)

Minimum duration of study 2 years

Admission requirements

- A recognised and applicable full research MEng degree with an average of at least 70% or a recognised and applicable taught master's degree with an average of at least 70% for the coursework and at least 70% for the mini-dissertation.
- The departmental Postgraduate Committee will evaluate the application and if the academic record is acceptable and the research idea falls within the departmental research areas, a supervisor will be allocated to the applicant. The applicant will then register for non-degree purposes for a maximum period of six months to prepare a full proposal in line with the prescripts on the departmental website. The departmental Postgraduate Committee will evaluate the proposal for admission.
- The applicant must have sufficient background knowledge of engineering/project/technology management, specifically in the proposed research field.

Other programme-specific information

Also consult the General Regulations.

- a. Subject to the stipulations of the General Regulations, no candidate is admitted to doctoral studies unless such a candidate holds a master's degree in Engineering or an equivalent master's degree.
- b. Unless otherwise decided by the Dean, on the recommendation of the supervisor, the PhD (Engineering) degree is awarded on the basis of a thesis and an examination on the thesis.
- c. Unless Senate, on the recommendation of the supervisor, decides otherwise, a student, before or on submission of a thesis, must submit proof of submission of an article from/issued by an accredited journal, to the Head: Student Administration. The submitted article should be based on the research that the student has conducted for the thesis and be approved by the supervisor if the supervisor is not a co-author. The supervisor shall be responsible for ensuring that the paper is taken through all the processes of revision and resubmission, as may be necessary. Conferment of the degree may be made subject to compliance with the stipulations of this regulation.
- d. The student must provide proof by means of his work, thesis and examination of advanced original research and/or creative work which makes a real and substantial contribution to the knowledge of engineering science and/or practice.

Curriculum: Year 1

Core modules

Thesis: [Engineering management 990](#) (IGB 990) - Credits: 360.00

Curriculum: Final year

Core modules

Thesis: Engineering management 990 (IGB 990) - Credits: 360.00

PhD Engineering Management (12263214)

Minimum duration of study 2 years

Admission requirements

- A recognised and applicable full research MEng degree with an average of at least 70% or a recognised and applicable taught master's degree with an average of at least 70% for the coursework and at least 70% for the mini-dissertation.
- The departmental Postgraduate Committee will evaluate the application and if the academic record is acceptable and the research idea falls within the departmental research areas, a supervisor will be allocated to the applicant. The applicant will then register for non-degree purposes for a maximum period of six months to prepare a full proposal in line with the prescripts on the departmental website. The departmental Postgraduate Committee will evaluate the proposal for admission.
- The applicant must have sufficient background knowledge of engineering/project/technology management, specifically in the proposed research field.

Other programme-specific information

Also consult the General Regulations.

- a. Subject to the stipulations of the General Regulations, a master's degree is required for admission to studies for a PhD.
- b. Unless otherwise decided by the Dean, on the recommendation of the supervisor, the PhD degree is awarded on the basis of a thesis and an examination on the thesis.
- c. Unless the Senate, on the recommendation of the supervisor, decides otherwise, a student, before or on submission of a thesis, must submit proof of submission of an article issued by an accredited journal, to the Head: Student Administration. The submitted article should be based on the research that the student has conducted for the thesis and be approved by the supervisor if the supervisor is not a co-author. The supervisor shall be responsible for ensuring that the paper is taken through all the processes of revision and resubmission, as may be necessary. Conferment of the degree may be made subject to compliance with the stipulations of this regulation.
- d. The student must provide proof by means of his work, thesis and examination of advanced original research and/or creative work which makes a real and substantial contribution to the knowledge of Engineering Science and/or Practice.

Curriculum: Year 1

Core modules

Thesis: Engineering management 990 (IGB 990) - Credits: 360.00

Curriculum: Final year

Core modules

Thesis: Engineering management 990 (IGB 990) - Credits: 360.00

PhD Industrial Engineering (12263002)

Minimum duration of study 2 years

Programme information

The doctorate degree is conferred on the basis of a thesis (360 credits).

Admission requirements

- A MEng degree awarded by the University of Pretoria or researched-based master's degree in engineering awarded by another university.
- The applicant must also meet the admission requirements for the BEng Hons degree.
- The departmental Postgraduate Committee may require additional honours modules for non-degree purposes where background is insufficient.
- All applicants from other universities must submit a copy of the master's dissertation in PDF format and a list of published journal articles (if any).
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.
- A research concept may be required; see departmental brochure.
- The applicant must determine the research group/focus area and a potential supervisor and confirm the potential supervisor's availability (see departmental website for research groups and heads of research groups). Admission will be granted only if the intended research fits in with the research foci of the Department and the supervision capacity exists, as decided by the Head of the Department.

Other programme-specific information

Also consult the General Regulations.

- a. Subject to the stipulations of the General Regulations, no candidate is admitted to doctoral studies unless such a candidate holds a master's degree in Engineering or an equivalent master's degree.
- b. Unless otherwise decided by the Dean, on the recommendation of the supervisor, the PhD (Engineering) degree is awarded on the basis of a thesis and an examination on the thesis.
- c. Unless Senate, on the recommendation of the supervisor, decides otherwise, a student, before or on submission of a thesis, must submit proof of submission of an article from/issued by an accredited journal, to the Head: Student Administration. The submitted article should be based on the research that the student has conducted for the thesis and be approved by the supervisor if the supervisor is not a co-author. The supervisor shall be responsible for ensuring that the paper is taken through all the processes of revision and resubmission, as may be necessary. Conferment of the degree may be made subject to compliance with the stipulations of this regulation.
- d. The student must provide proof by means of his work, thesis and examination of advanced original research and/or creative work which makes a real and substantial contribution to the knowledge of engineering science and/or practice.

Please refer to the Programme Guide for further information, available [here](#).

Curriculum: Year 1

Core modules

Thesis: Industrial engineering 990 (BIR 990) - Credits: 360.00

Curriculum: Final year

Core modules

Thesis: Industrial engineering 990 (BIR 990) - Credits: 360.00

PhD Industrial Systems (12263132)

Minimum duration of study 2 years

Programme information

The doctorate degree is conferred on the basis of a thesis (360 credits).

Admission requirements

- An appropriate research-based master's degree
- The departmental Postgraduate Committee may require additional honours modules for non-degree purposes where background is insufficient.
- All applicants from other universities must submit a copy of the master's dissertation in PDF format and a list of published journal articles (if any).
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.
- A research concept may be required; see departmental brochure.
- The applicant must determine the research group/focus area and a potential supervisor and confirm the potential supervisor's availability (see departmental website for research groups and heads of research groups). Admission will be granted only if the intended research fits in with the research foci of the Department and the supervision capacity exists, as decided by the Head of the Department.

Other programme-specific information

Also consult the General Regulations.

- a. Subject to the stipulations of the General Regulations, a master's degree is required for admission to studies for a PhD.
- b. Unless otherwise decided by the Dean, on the recommendation of the supervisor, the PhD degree is awarded on the basis of a thesis and an examination on the thesis.
- c. Unless the Senate, on the recommendation of the supervisor, decides otherwise, a student, before or on submission of a thesis, must submit proof of submission of an article issued by an accredited journal, to the Head: Student Administration. The submitted article should be based on the research that the student has conducted for the thesis and be approved by the supervisor if the supervisor is not a co-author. The supervisor shall be responsible for ensuring that the paper is taken through all the processes of revision and resubmission, as may be necessary. Conferment of the degree may be made subject to compliance with the stipulations of this regulation.
- d. The student must provide proof by means of his work, thesis and examination of advanced original research and/or creative work which makes a real and substantial contribution to the knowledge of Engineering Science and/or Practice.

Please refer to the Programme Guide for further information, available [here](#).

Curriculum: Year 1

Core modules

Thesis: Industrial systems 990 (BIT 990) - Credits: 360.00

Curriculum: Final year

Core modules

Thesis: Industrial systems 990 (BIT 990) - Credits: 360.00

PhD Information Science (12264005)

Minimum duration of study 2 years

Contact Prof AL Dick archie.dick@up.ac.za +27 (0)124202294

Admission requirements

- MIS (Library Science)
- MIS (Information Science)
- MIS (Multimedia)
- MIS (Publishing)
- MIS (Development Communication)
- or an equivalent master's degree

Additional requirements

Consult G Regulations G.42 to G.54.

Curriculum: Year 1

Core modules

Thesis: Information science 990 (INL 990) - Credits: 360.00

Curriculum: Final year

Core modules

Thesis: Information science 990 (INL 990) - Credits: 360.00

PhD Information Systems (12264011)

Minimum duration of study 2 years

Programme information

Unless the Dean, on the recommendation of the chairperson of the school, decides otherwise, the PhD degree is conferred on the basis of a thesis and an examination on the thesis.

Admission requirements

- A master's degree in Information Technology/Information Systems with at least 65% (average for all the

courses and also for the mini-dissertation or for the dissertation). In exceptional cases an applicant with a master's degree in other relevant fields might be considered for admission by the departmental Postgraduate Committee.

- An applicant may be expected to do preparatory study, the extent of which will be decided upon in consultation with the applicant.

Research information

Unless Senate, on the recommendation of the supervisor, decides otherwise, a student, before or on submission of a thesis, must submit proof of submission of an article to an accredited journal, to the Head: Student Administration. The draft or submitted article, as the case may be, should be based on the research that the student has conducted for the thesis and be approved by the supervisor if the supervisor is not a co-author. The supervisor shall be responsible for ensuring that the paper is taken through all the processes of revision and resubmission, as may be necessary. Conferment of the degree may be made subject to compliance with the stipulations of this regulation.

The student must provide proof by means of his or her work, thesis and examination of advanced original research and/or creative work which makes a real and substantial contribution to the relevant field of research.

Curriculum: Year 1

Core modules

Thesis: Information Systems 990 (ISY 990) - Credits: 360.00

Curriculum: Final year

Core modules

Thesis: Information Systems 990 (ISY 990) - Credits: 360.00

PhD Information Technology (12264010)

Minimum duration of study 2 years

Programme information

Unless the Dean, on the recommendation of the chairperson of the school, decides otherwise, the PhD degree is conferred on the basis of a thesis and an examination on the thesis.

Admission requirements

- A master's degree in information technology/computer science/information systems/information science with at least 65% (average for all the courses and also for the mini-dissertation or for the dissertation) is required. In exceptional cases an applicant with a master's degree in other relevant fields might be considered for admission by the departmental Postgraduate Committee.

Research information

Unless Senate, on the recommendation of the supervisor, decides otherwise, a student, before or on submission of a thesis, must submit proof of submission of an article to an accredited journal, to the Head: Student Administration. The draft or submitted article, as the case may be, should be based on the research that the student has conducted for the thesis and be approved by the supervisor if the supervisor is not a co-author. The supervisor shall be responsible for ensuring that the paper is taken through all the processes of revision and

resubmission, as may be necessary. Conferment of the degree may be made subject to compliance with the stipulations of this regulation.

The student must provide proof by means of his or her work, thesis and examination of advanced original research and/or creative work which makes a real and substantial contribution to the relevant field of research.

Curriculum: Year 1

Core modules

Thesis: Information technology 990 (SIT 990) - Credits: 360.00

Thesis: Information technology 991 (SIT 991) - Credits: 360.00

Thesis: Information technology 992 (SIT 992) - Credits: 360.00

Curriculum: Final year

Core modules

Thesis: Information technology 990 (SIT 990) - Credits: 360.00

Thesis: Information technology 991 (SIT 991) - Credits: 360.00

Thesis: Information technology 992 (SIT 992) - Credits: 360.00

PhD Interior Architecture (12262009)

Minimum duration of study 2 years

Contact Prof BP Jekot barbara.jekot@up.ac.za +27 (0)124204052

Programme information

A PhD student must submit a thesis which deals with a topic from the discipline of interior architecture and which provides proof of advanced original research and/or creative work which makes a real and substantial contribution to the knowledge and/or practice of interior architecture.

A student must submit at least one draft article to a recognised journal for publication, before or concurrent with the submission of the thesis. The draft article must be based on the research undertaken for the thesis and must be acceptable to the supervisor.

Also refer to G Regulations G.42 to G.54.

Admission requirements

- A master's degree in Interior Architecture or an associated field (such as architecture, urban design, multimedia, industrial design, construction, engineering, visual arts, sociology, or any other field deemed acceptable by the departmental Postgraduate Committee).
- The departmental Postgraduate Committee reserves the right to decide if the applicant is suitable for postgraduate studies based on the academic transcript and required application documentation. The Department has limited supervisory capacity and only accepts candidates for whom it is able to provide supervision. The applicant must intend to do research in the domain of interior architecture, must determine the research focus area and a potential supervisor and confirm the potential supervisor's availability (consult departmental website for research focus areas, potential supervisors, as well as required application documentation and procedures).
- An applicant in possession of a master's degree by coursework may be requested by the departmental Postgraduate Committee to complete a research methodology course prior to commencing studies.

Additional requirements

Candidates in possession of a master's degree by coursework may, at the discretion of the relevant head of department, be required to pass supplementary modules prior to commencing of studies.

Examinations and pass requirements

The doctoral examination, either written or oral, **is compulsory**, and covers the content of the thesis as well as the field of study on which the thesis is based.

Curriculum: Year 1

Core modules

Thesis: Interior architecture 990 (INT 990) - Credits: 360.00

Curriculum: Final year

Core modules

Thesis: Interior architecture 990 (INT 990) - Credits: 360.00

PhD Landscape Architecture (12262005)

Minimum duration of study 2 years

Contact	Dr N Botes	nico.botes@up.ac.za	+27 (0)124204600
	Prof AAJ Barker	arthur.barker@up.ac.za	+27 (0)124204542

Programme information

A PhD student must submit a thesis, which deals with a topic from the discipline of landscape architecture and which provides proof of advanced original research and/or creative work which makes a real and substantial contribution to the field of knowledge and/or practice of landscape architecture.

A student must submit at least one draft article to a recognised journal for publication, before or concurrent with the submission of the thesis. The draft article must be based on the research undertaken for the thesis and must be acceptable to the supervisor.

Refer to General Regulations G.42 to G.54.

Admission requirements

- A master's degree in Landscape Architecture or an associated field (such as architecture, urban design, civil engineering, planning, construction, geography, visual arts, ecology, or any other field deemed acceptable by the departmental Postgraduate Committee).
- The departmental Postgraduate Committee reserves the right to decide if the applicant is suitable for postgraduate studies based on the academic transcript and required application documentation. The Department has limited supervisory capacity and only accepts candidates for whom it is able to provide supervision. The applicant must intend to do research in the domain of landscape architecture, must determine the research focus area and a potential supervisor and confirm the potential supervisor's availability (consult departmental website for research focus areas, potential supervisors, as well as required application documentation and procedures).
- An applicant in possession of a master's degree by coursework may be requested by the departmental

Postgraduate Committee to complete a research methodology course prior to commencing studies.

Additional requirements

Candidates in possession of a master's degree by coursework may, at the discretion of the relevant head of department, be required to do supplementary coursework prior to commencing studies.

Examinations and pass requirements

The doctoral examination, either written or oral, **is compulsory**, and encompasses the content of the thesis as well as the field of study on which the thesis is based.

Curriculum: Year 1

Core modules

Thesis: [Landscape architecture 990](#) (LAN 990) - Credits: 360.00

Curriculum: Final year

Core modules

Thesis: [Landscape architecture 990](#) (LAN 990) - Credits: 360.00

PhD Library Science (12264006)

Minimum duration of study 2 years

Contact Prof AL Dick archie.dick@up.ac.za +27 (0)124202294

Admission requirements

- An MIS (Information Science/Multimedia/Publishing), or an equivalent master's degree; or an MA (Development Communication) or an equivalent master's degree.
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and to decide if the applicant is suitable for postgraduate studies. An applicant also needs to identify a research focus area/field and a potential supervisor within the department and submit an abstract on proposed research ideas of approximately 800 to 1200 words on the proposed research.

Additional requirements

Consult G Regulations G.42 to G.54.

Curriculum: Year 1

Core modules

Thesis: [Library science 990](#) (BIB 990) - Credits: 360.00

Curriculum: Final year

Core modules

Thesis: [Library science 990](#) (BIB 990) - Credits: 360.00

PhD Mechanical Engineering (12263042)

Minimum duration of study 2 years

Admission requirements

- A MEng degree awarded by the University of Pretoria or researched-based master's degree in engineering awarded by another university.
- The applicant must also meet the admission requirements for the BEng Hons degree.
- The departmental Postgraduate Committee may require additional honours modules for non-degree purposes where background is insufficient.
- All applicants from other universities must submit a copy of the master's dissertation in PDF format and a list of published journal articles (if any).
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.
- A research concept may be required; see departmental brochure.
- The applicant must determine the research group/focus area and a potential supervisor and confirm the potential supervisor's availability (see departmental website for research groups and heads of research groups). Admission will be granted only if the intended research fits in with the research foci of the Department and the supervision capacity exists, as decided by the Head of the Department.

Other programme-specific information

Also consult the General Regulations.

- a. Subject to the stipulations of the General Regulations, no candidate is admitted to doctoral studies unless such a candidate holds a master's degree in Engineering or an equivalent master's degree.
- b. Unless otherwise decided by the Dean, on the recommendation of the supervisor, the PhD (Engineering) degree is awarded on the basis of a thesis and an examination on the thesis.
- c. Unless Senate, on the recommendation of the supervisor, decides otherwise, a student, before or on submission of a thesis, must submit proof of submission of an article from/issued by an accredited journal, to the Head: Student Administration. The submitted article should be based on the research that the student has conducted for the thesis and be approved by the supervisor if the supervisor is not a co-author. The supervisor shall be responsible for ensuring that the paper is taken through all the processes of revision and resubmission, as may be necessary. Conferment of the degree may be made subject to compliance with the stipulations of this regulation.
- d. The student must provide proof by means of his work, thesis and examination of advanced original research and/or creative work which makes a real and substantial contribution to the knowledge of engineering science and/or practice.

Curriculum: Year 1

Core modules

Thesis: Mechanical engineering 990 (MIR 990) - Credits: 360.00

Curriculum: Final year

Core modules

Thesis: Mechanical engineering 990 (MIR 990) - Credits: 360.00

PhD Mechanics (12263172)

Minimum duration of study 2 years

Admission requirements

- An appropriate research-based master's degree
- The departmental Postgraduate Committee may require additional honours modules for non-degree purposes where background is insufficient.
- All applicants from other universities must submit a copy of the master's dissertation in PDF format and a list of published journal articles (if any).
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.
- A research concept may be required; see departmental brochure.
- The applicant must determine the research group/focus area and a potential supervisor and confirm the potential supervisor's availability (see departmental website for research groups and heads of research groups). Admission will be granted only if the intended research fits in with the research foci of the Department and the supervision capacity exists, as decided by the Head of the Department.

Other programme-specific information

Also consult the General Regulations.

- a. Subject to the stipulations of the General Regulations, a master's degree is required for admission to studies for a PhD.
- b. Unless otherwise decided by the Dean, on the recommendation of the supervisor, the PhD degree is awarded on the basis of a thesis and an examination on the thesis.
- c. Unless the Senate, on the recommendation of the supervisor, decides otherwise, a student, before or on submission of a thesis, must submit proof of submission of an article issued by an accredited journal, to the Head: Student Administration. The submitted article should be based on the research that the student has conducted for the thesis and be approved by the supervisor if the supervisor is not a co-author. The supervisor shall be responsible for ensuring that the paper is taken through all the processes of revision and resubmission, as may be necessary. Conferment of the degree may be made subject to compliance with the stipulations of this regulation.
- d. The student must provide proof by means of his work, thesis and examination of advanced original research and/or creative work which makes a real and substantial contribution to the knowledge of Engineering Science and/or Practice.

Curriculum: Year 1

Core modules

Thesis: [Mechanics 998](#) (MIR 998) - Credits: 360.00

Curriculum: Final year

Core modules

Thesis: [Mechanics 998](#) (MIR 998) - Credits: 360.00

PhD Metallurgical Engineering (12263052)

Minimum duration of study 2 years

Admission requirements

- A MEng degree awarded by the University of Pretoria or researched-based master's degree in engineering awarded by another university.
- The applicant must also meet the admission requirements for the BEng Hons degree.
- The departmental Postgraduate Committee may require additional honours modules for non-degree purposes where background is insufficient.
- All applicants from other universities must submit a copy of the master's dissertation in PDF format and a list of published journal articles (if any).
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.
- A research concept may be required; see departmental brochure.
- The applicant must determine the research group/focus area and a potential supervisor and confirm the potential supervisor's availability (see departmental website for research groups and heads of research groups). Admission will be granted only if the intended research fits in with the research foci of the Department and the supervision capacity exists, as decided by the Head of the Department.

Other programme-specific information

Also consult the General Regulations.

- a. Subject to the stipulations of the General Regulations, no candidate is admitted to doctoral studies unless such a candidate holds a master's degree in Engineering or an equivalent master's degree.
- b. Unless otherwise decided by the Dean, on the recommendation of the supervisor, the PhD (Engineering) degree is awarded on the basis of a thesis and an examination on the thesis.
- c. Unless Senate, on the recommendation of the supervisor, decides otherwise, a student, before or on submission of a thesis, must submit proof of submission of an article from/issued by an accredited journal, to the Head: Student Administration. The submitted article should be based on the research that the student has conducted for the thesis and be approved by the supervisor if the supervisor is not a co-author. The supervisor shall be responsible for ensuring that the paper is taken through all the processes of revision and resubmission, as may be necessary. Conferment of the degree may be made subject to compliance with the stipulations of this regulation.
- d. The student must provide proof by means of his work, thesis and examination of advanced original research and/or creative work which makes a real and substantial contribution to the knowledge of engineering science and/or practice.

Curriculum: Year 1

Core modules

Thesis: Metallurgical engineering 990 (MIN 990) - Credits: 360.00

Curriculum: Final year

Core modules

Thesis: Metallurgical engineering 990 (MIN 990) - Credits: 360.00

PhD Metallurgy (12263182)

Minimum duration of study 2 years

Admission requirements

- An appropriate research-based master's degree
- The departmental Postgraduate Committee may require additional honours modules for non-degree purposes where background is insufficient.
- All applicants from other universities must submit a copy of the master's dissertation in PDF format and a list of published journal articles (if any).
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.
- A research concept may be required; see departmental brochure.
- The applicant must determine the research group/focus area and a potential supervisor and confirm the potential supervisor's availability (see departmental website for research groups and heads of research groups). Admission will be granted only if the intended research fits in with the research foci of the Department and the supervision capacity exists, as decided by the Head of the Department.

Other programme-specific information

Also consult the General Regulations.

- a. Subject to the stipulations of the General Regulations, a master's degree is required for admission to studies for a PhD.
- b. Unless otherwise decided by the Dean, on the recommendation of the supervisor, the PhD degree is awarded on the basis of a thesis and an examination on the thesis.
- c. Unless the Senate, on the recommendation of the supervisor, decides otherwise, a student, before or on submission of a thesis, must submit proof of submission of an article issued by an accredited journal, to the Head: Student Administration. The submitted article should be based on the research that the student has conducted for the thesis and be approved by the supervisor if the supervisor is not a co-author. The supervisor shall be responsible for ensuring that the paper is taken through all the processes of revision and resubmission, as may be necessary. Conferment of the degree may be made subject to compliance with the stipulations of this regulation.
- d. The student must provide proof by means of his work, thesis and examination of advanced original research and/or creative work which makes a real and substantial contribution to the knowledge of Engineering Science and/or Practice.

Curriculum: Year 1

Core modules

Thesis: Metallurgy 990 (MTG 990) - Credits: 360.00

Curriculum: Final year

Core modules

Thesis: Metallurgy 990 (MTG 990) - Credits: 360.00

PhD Mining (12263192)

Minimum duration of study 2 years

Admission requirements

- An appropriate research-based master's degree
- The departmental Postgraduate Committee may require additional honours modules for non-degree purposes where background is insufficient.
- All applicants from other universities must submit a copy of the master's dissertation in PDF format and a list of published journal articles (if any).
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.
- A research concept may be required; see departmental brochure.
- The applicant must determine the research group/focus area and a potential supervisor and confirm the potential supervisor's availability (see departmental website for research groups and heads of research groups). Admission will be granted only if the intended research fits in with the research foci of the Department and the supervision capacity exists, as decided by the Head of the Department.

Other programme-specific information

Also consult the General Regulations.

- a. Subject to the stipulations of the General Regulations, a master's degree is required for admission to studies for a PhD.
- b. Unless otherwise decided by the Dean, on the recommendation of the supervisor, the PhD degree is awarded on the basis of a thesis and an examination on the thesis.
- c. Unless the Senate, on the recommendation of the supervisor, decides otherwise, a student, before or on submission of a thesis, must submit proof of submission of an article issued by an accredited journal, to the Head: Student Administration. The submitted article should be based on the research that the student has conducted for the thesis and be approved by the supervisor if the supervisor is not a co-author. The supervisor shall be responsible for ensuring that the paper is taken through all the processes of revision and resubmission, as may be necessary. Conferment of the degree may be made subject to compliance with the stipulations of this regulation.
- d. The student must provide proof by means of his work, thesis and examination of advanced original research and/or creative work which makes a real and substantial contribution to the knowledge of Engineering Science and/or Practice.

Curriculum: Year 1

Core modules

Thesis: Mining 990 (MYL 990) - Credits: 360.00

Curriculum: Final year

Core modules

Thesis: Mining 990 (MYL 990) - Credits: 360.00

PhD Mining Engineering (12263062)

Minimum duration of study 2 years

Admission requirements

- A MEng degree awarded by the University of Pretoria or researched-based master's degree in engineering awarded by another university.
- The applicant must also meet the admission requirements for the BEng Hons degree.
- The departmental Postgraduate Committee may require additional honours modules for non-degree purposes where background is insufficient.
- All applicants from other universities must submit a copy of the master's dissertation in PDF format and a list of published journal articles (if any).
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.
- A research concept may be required; see departmental brochure.
- The applicant must determine the research group/focus area and a potential supervisor and confirm the potential supervisor's availability (see departmental website for research groups and heads of research groups). Admission will be granted only if the intended research fits in with the research foci of the Department and the supervision capacity exists, as decided by the Head of the Department.

Other programme-specific information

Also consult the General Regulations.

- a. Subject to the stipulations of the General Regulations, no candidate is admitted to doctoral studies unless such a candidate holds a master's degree in Engineering or an equivalent master's degree.
- b. Unless otherwise decided by the Dean, on the recommendation of the supervisor, the PhD (Engineering) degree is awarded on the basis of a thesis and an examination on the thesis.
- c. Unless Senate, on the recommendation of the supervisor, decides otherwise, a student, before or on submission of a thesis, must submit proof of submission of an article from/issued by an accredited journal, to the Head: Student Administration. The submitted article should be based on the research that the student has conducted for the thesis and be approved by the supervisor if the supervisor is not a co-author. The supervisor shall be responsible for ensuring that the paper is taken through all the processes of revision and resubmission, as may be necessary. Conferment of the degree may be made subject to compliance with the stipulations of this regulation.
- d. The student must provide proof by means of his work, thesis and examination of advanced original research and/or creative work which makes a real and substantial contribution to the knowledge of engineering science and/or practice.

Curriculum: Year 1

Core modules

Thesis: Mining engineering 990 (MYI 990) - Credits: 360.00

Curriculum: Final year

Core modules

Thesis: Mining engineering 990 (MYI 990) - Credits: 360.00

PhD Project Management (12261092)

Minimum duration of study 2 years

Admission requirements

- A recognised and applicable full research MEng degree with an average of at least 70% or a recognised and applicable taught master's degree with an average of at least 70% for the coursework and at least 70% for the mini-dissertation.
- The departmental Postgraduate Committee will evaluate the application and if the academic record is acceptable and the research idea falls within the departmental research areas, a supervisor will be allocated to the applicant. The applicant will then register for non-degree purposes for a maximum period of six months to prepare a full proposal in line with the prescripts on the departmental website. The departmental Postgraduate Committee will evaluate the proposal for admission.
- The applicant must have sufficient background knowledge of engineering/project/technology management, specifically in the proposed research field.

Other programme-specific information

Also consult the General Regulations.

- a. Subject to the stipulations of the General Regulations, no candidate is admitted to doctoral studies unless such a candidate holds a master's degree in Engineering or an equivalent master's degree.
- b. Unless otherwise decided by the Dean, on the recommendation of the supervisor, the PhD (Engineering) degree is awarded on the basis of a thesis and an examination on the thesis.
- c. Unless Senate, on the recommendation of the supervisor, decides otherwise, a student, before or on submission of a thesis, must submit proof of submission of an article from/issued by an accredited journal, to the Head: Student Administration. The submitted article should be based on the research that the student has conducted for the thesis and be approved by the supervisor if the supervisor is not a co-author. The supervisor shall be responsible for ensuring that the paper is taken through all the processes of revision and resubmission, as may be necessary. Conferment of the degree may be made subject to compliance with the stipulations of this regulation.
- d. The student must provide proof by means of his work, thesis and examination of advanced original research and/or creative work which makes a real and substantial contribution to the knowledge of engineering science and/or practice.

Curriculum: Year 1

Core modules

Thesis: Project management 990 (IPK 990) - Credits: 360.00

Curriculum: Final year

Core modules

Thesis: Project management 990 (IPK 990) - Credits: 360.00

PhD Project Management (12263216)

Minimum duration of study 2 years

Admission requirements

- A recognised and applicable full research MEng degree with an average of at least 70% or a recognised and applicable taught master's degree with an average of at least 70% for the coursework and at least 70% for the mini-dissertation.
- The departmental Postgraduate Committee will evaluate the application and if the academic record is acceptable and the research idea falls within the departmental research areas, a supervisor will be allocated to the applicant. The applicant will then register for non-degree purposes for a maximum period of six months to prepare a full proposal in line with the prescripts on the departmental website. The departmental Postgraduate Committee will evaluate the proposal for admission.
- The applicant must have sufficient background knowledge of engineering/project/technology management, specifically in the proposed research field.

Other programme-specific information

Also consult the General Regulations.

- a. Subject to the stipulations of the General Regulations, a master's degree is required for admission to studies for a PhD.
- b. Unless otherwise decided by the Dean, on the recommendation of the supervisor, the PhD degree is awarded on the basis of a thesis and an examination on the thesis.
- c. Unless the Senate, on the recommendation of the supervisor, decides otherwise, a student, before or on submission of a thesis, must submit proof of submission of an article issued by an accredited journal, to the Head: Student Administration. The submitted article should be based on the research that the student has conducted for the thesis and be approved by the supervisor if the supervisor is not a co-author. The supervisor shall be responsible for ensuring that the paper is taken through all the processes of revision and resubmission, as may be necessary. Conferment of the degree may be made subject to compliance with the stipulations of this regulation.
- d. The student must provide proof by means of his work, thesis and examination of advanced original research and/or creative work which makes a real and substantial contribution to the knowledge of Engineering Science and/or Practice.

Curriculum: Year 1

Core modules

Thesis: Project management 990 (IPK 990) - Credits: 360.00

Curriculum: Final year

Core modules

Thesis: Project management 990 (IPK 990) - Credits: 360.00

PhD Publishing (12264007)

Minimum duration of study 2 years

Contact	Prof EH le Roux beth.leroux@up.ac.za +27 (0)124202426
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Admission requirements

- An MIS (Information Science/Multimedia/Publishing) or an equivalent master's degree; or an MA (Development Communication) or an equivalent master's degree.
- The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and to decide if the applicant is suitable for postgraduate studies. An applicant also needs to identify a research focus area/field and a potential supervisor in the department and submit an abstract on proposed research ideas of approximately 800 to 1200 words.

Additional requirements

Consult G Regulations G.42 to G.54.

Curriculum: Year 1

Core modules

Thesis: Publishing 990 (PUB 990) - Credits: 360.00

Curriculum: Final year

Core modules

Thesis: Publishing 990 (PUB 990) - Credits: 360.00

PhD Quantity Surveying (12262017)

Minimum duration of study 2 years

Contact	Prof BG Zulch benita.zulch@up.ac.za +27 (0)124202851
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Programme information

A PhD student must submit a thesis which deals with a topic from the list of subject disciplines.

Admission requirements

- A master's degree in Quantity Surveying or an associated field (such as construction management, real estate, civil engineering, architecture, or any other field deemed acceptable by the Departmental Postgraduate Committee); or a MBA/MBL degree for applicants with an honours degree in either quantity surveying, construction management or real estate.
- The departmental Postgraduate Committee reserves the right to decide if the applicant is suitable for postgraduate studies based on the academic transcript and required application documentation. The Department has limited supervisory capacity and only accepts candidates for whom it is able to provide supervision. The applicant must intend to do research in the domain of quantity surveying, must determine the research focus area and a potential supervisor and confirm the potential supervisor's availability (consult departmental website for research focus areas, potential supervisors, as well as required application documentation and procedures).
- An applicant in possession of a master's degree by coursework may be requested by the departmental Postgraduate Committee to complete a research methodology course prior to commencing studies.

Examinations and pass requirements

The doctoral examination, either written or oral, is compulsory, and covers the content of the thesis as well as the sections of the field of study on which the thesis is based.

Curriculum: Year 1

Core modules

Thesis: Quantity surveying 990 (BRK 990) - Credits: 360.00

Curriculum: Final year

Core modules

Thesis: Quantity surveying 990 (BRK 990) - Credits: 360.00

PhD Real Estate (12262019)

Minimum duration of study 2 years

Contact Prof BG Zulch benita.zulch@up.ac.za +27 (0)124202851

Programme information

A PhD student must submit a thesis which deals with a topic from the list of subject disciplines.

Admission requirements

- A master's degree in Real Estate or an associated field (such as construction management, quantity surveying, civil engineering, architecture, or any other field deemed acceptable by the Departmental Postgraduate Committee); or a MBA/MBL degree for applicants with an honours degree in either quantity surveying, construction management or real estate
- The departmental Postgraduate Committee reserves the right to decide if the applicant is suitable for postgraduate studies based on the academic transcript and required application documentation. The Department has limited supervisory capacity and only accepts candidates for whom it is able to provide supervision. The applicant must intend to do research in the domain of real estate and property development, must determine the research focus area and a potential supervisor and confirm the potential supervisor's availability (consult departmental website for research focus areas, potential supervisors, as well as required application documentation and procedures).
- An applicant in possession of a master's degree by coursework may be requested by the departmental Postgraduate Committee to complete a research methodology course prior to commencing studies.

Examinations and pass requirements

The doctoral examination, either written or oral, is compulsory, and covers the content of the thesis as well as the sections of the field of study on which the thesis is based.

Curriculum: Year 1

Core modules

Thesis: Real estate 990 (EMW 990) - Credits: 360.00

Curriculum: Final year

Core modules

Thesis: Real estate 990 (EMW 990) - Credits: 360.00

PhD Technology and Innovation Management (12261082)

Minimum duration of study 2 years

Admission requirements

- A recognised and applicable full research MEng degree with an average of at least 70% or a recognised and applicable taught master's degree with an average of at least 70% for the coursework and at least 70% for the mini-dissertation.
- The departmental Postgraduate Committee will evaluate the application and if the academic record is acceptable and the research idea falls within the departmental research areas, a supervisor will be allocated to the applicant. The applicant will then register for non-degree purposes for a maximum period of six months to prepare a full proposal in line with the prescripts on the departmental website. The departmental Postgraduate Committee will evaluate the proposal for admission.
- The applicant must have sufficient background knowledge of engineering/project/technology management, specifically in the proposed research field.

Other programme-specific information

Also consult the General Regulations.

- a. Subject to the stipulations of the General Regulations, no candidate is admitted to doctoral studies unless such a candidate holds a master's degree in Engineering or an equivalent master's degree.
- b. Unless otherwise decided by the Dean, on the recommendation of the supervisor, the PhD (Engineering) degree is awarded on the basis of a thesis and an examination on the thesis.
- c. Unless Senate, on the recommendation of the supervisor, decides otherwise, a student, before or on submission of a thesis, must submit proof of submission of an article from/issued by an accredited journal, to the Head: Student Administration. The submitted article should be based on the research that the student has conducted for the thesis and be approved by the supervisor if the supervisor is not a co-author. The supervisor shall be responsible for ensuring that the paper is taken through all the processes of revision and resubmission, as may be necessary. Conferment of the degree may be made subject to compliance with the stipulations of this regulation.
- d. The student must provide proof by means of his work, thesis and examination of advanced original research and/or creative work which makes a real and substantial contribution to the knowledge of engineering science and/or practice.

Curriculum: Year 1

Core modules

Thesis: Technology and innovation management 990 (ITB 990) - Credits: 360.00

Curriculum: Final year

Core modules

Thesis: Technology and innovation management 990 (ITB 990) - Credits: 360.00

PhD Technology and Innovation Management (12263215)

Minimum duration of study 2 years

Admission requirements

- A recognised and applicable full research MEng degree with an average of at least 70% or a recognised and applicable taught master's degree with an average of at least 70% for the coursework and at least 70% for the mini-dissertation.
- The departmental Postgraduate Committee will evaluate the application and if the academic record is acceptable and the research idea falls within the departmental research areas, a supervisor will be allocated to the applicant. The applicant will then register for non-degree purposes for a maximum period of six months to prepare a full proposal in line with the prescripts on the departmental website. The departmental Postgraduate Committee will evaluate the proposal for admission.
- The applicant must have sufficient background knowledge of engineering/project/technology management, specifically in the proposed research field.

Other programme-specific information

Also consult the General Regulations.

- a. Subject to the stipulations of the General Regulations, a master's degree is required for admission to studies for a PhD.
- b. Unless otherwise decided by the Dean, on the recommendation of the supervisor, the PhD degree is awarded on the basis of a thesis and an examination on the thesis.
- c. Unless the Senate, on the recommendation of the supervisor, decides otherwise, a student, before or on submission of a thesis, must submit proof of submission of an article issued by an accredited journal, to the Head: Student Administration. The submitted article should be based on the research that the student has conducted for the thesis and be approved by the supervisor if the supervisor is not a co-author. The supervisor shall be responsible for ensuring that the paper is taken through all the processes of revision and resubmission, as may be necessary. Conferment of the degree may be made subject to compliance with the stipulations of this regulation.
- d. The student must provide proof by means of his work, thesis and examination of advanced original research and/or creative work which makes a real and substantial contribution to the knowledge of Engineering Science and/or Practice.

Curriculum: Year 1

Core modules

Thesis: Technology and innovation management 990 (ITB 990) - Credits: 360.00

Curriculum: Final year

Core modules

Thesis: Technology and innovation management 990 (ITB 990) - Credits: 360.00

PhD Town and Regional Planning (12262023)

Minimum duration of study 2 years

Programme information

A student for the PhD degree must submit a thesis as well as an academic article(s) dealing with a topic in the field of study.

Also refer to G Regulations G.42 to G.54.

Admission requirements

- A master's degree in Town and Regional planning; or an applicable master's degree deemed acceptable by the departmental Postgraduate Committee.
- The departmental Postgraduate Committee reserves the right to decide if the applicant is suitable for postgraduate studies based on the academic transcript and required application documentation. The Department has limited supervisory capacity and only accepts candidates for whom it is able to provide supervision. The applicant must determine the research focus area and a potential supervisor and confirm the potential supervisor's availability (consult departmental website for research focus areas, potential supervisors, as well as required application documentation and procedures).
- An applicant may be requested by the departmental Postgraduate Committee to complete a research methodology course prior to commencing studies.

Additional requirements

A student must have successfully completed a relevant module in research methodology in order for his/her study proposal to be approved.

Examinations and pass requirements

An oral and/or written doctoral examination is required dealing with the contents of the thesis as well as the subject matter of the discipline on which it is based.

Curriculum: Year 1

Core modules

Thesis: Town and regional planning 990 (SSB 990) - Credits: 360.00

Curriculum: Final year

Core modules

Thesis: Town and regional planning 990 (SSB 990) - Credits: 360.00

Modules

Earth studies 110 (AAL 110)

Qualification	Undergraduate
Module credits	8.00
Programmes	BSc Architecture BSc Interior Architecture BSc Landscape Architecture
Prerequisites	No prerequisites.
Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	Architecture
Period of presentation	Semester 1

Module content

Introduction to ecosystemic and systems thinking, ecology, natural resources and stress on the environment; social ecological systems and wellbeing; ecological design principles.

Earth studies 120 (AAL 120)

Qualification	Undergraduate
Module credits	8.00
Prerequisites	No prerequisites.
Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	Architecture
Period of presentation	Semester 2

Module content

Introduction to natural materials, their basic properties and transformation for application in the built environment.

Earth studies 210 (AAL 210)

Qualification	Undergraduate
Module credits	8.00
Programmes	BSc Architecture BSc Interior Architecture BSc Landscape Architecture
Prerequisites	No prerequisites.
Contact time	3 lectures per week

Language of tuition	Module is presented in English
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Department	Architecture
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Period of presentation	Semester 1
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Module content

Designing towards wellbeing within the built environment: responsive and passive design in natural and mesoscale environments.

Earth studies 220 (AAL 220)

Qualification	Undergraduate
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Module credits	8.00
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Prerequisites	No prerequisites.
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Contact time	3 lectures per week
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Language of tuition	Module is presented in English
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Department	Architecture
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Period of presentation	Semester 2
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Module content

Designing towards wellbeing within the built environment: inclusive design, health and user comfort in interior environments.

Earth studies 223 (AAL 223)

Qualification	Undergraduate
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Module credits	4.00
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Programmes	BSc Interior Architecture
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Prerequisites	No prerequisites.
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Language of tuition	Module is presented in English
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Department	Architecture
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Period of presentation	Quarter 3
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Module content

The impact of social, economic and political systems on, and the multidisciplinary approach to design decisionmaking for inclusive environments and barrier-free environments. The application of this understanding in developing communities.

Earth studies 224 (AAL 224)

Qualification	Undergraduate
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Module credits	4.00
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Programmes	BSc Architecture BSc Interior Architecture
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Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Architecture
Period of presentation	Quarter 4

Module content

Environmental filters and forecasting techniques:

Sound: the physical nature of sound, physiology of hearing, sound and noise sources, transfer, absorption and isolation, noise control; measurement, levels, frequency analysis, A-loading, room acoustics, reverberation periods.

Light: properties of natural light, design criteria, daylight factors, diffusion, quality, energy requirements and saving.

Earth studies 320 (AAL 320)

Qualification	Undergraduate
Module credits	6.00
Programmes	BSc Architecture BSc Interior Architecture BSc Landscape Architecture
Prerequisites	AAL 210
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Architecture
Period of presentation	Semester 2

Module content

Ecosystemic thinking for the designer in terms of culture, science and environment. The designer as critic; analysis of precedents. Application of principles of sustainable development and ecological design including energy demand and efficiency and energy dissipation.

Labour law 311 (ABR 311)

Qualification	Undergraduate
Module credits	20.00
Programmes	BCom BCom Human Resource Management BSc Construction Management BSocSci Industrial Sociology and Labour Studies
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Economic and Management Sciences Faculty of Humanities
Prerequisites	No prerequisites.

Contact time	1 tutorial every 2nd week, 2 lectures per week
Language of tuition	Separate classes for Afrikaans and English
Department	Mercantile Law
Period of presentation	Semester 1

Module content

Basic principles of the employment contract. Collective labour law. Statutory conditions of employment. Individual labour disputes. Collective labour disputes. Settlement procedures.

Labour relations 320 (ABV 320)

Qualification	Undergraduate
Module credits	20.00

Programmes

BCom
 BCom Human Resource Management
 BConSci Food Retail Management
 BConSci Hospitality Management
 BEng Industrial Engineering
 BEng Industrial Engineering ENGAGE
 BSocSci Industrial Sociology and Labour Studies

Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Humanities Faculty of Natural and Agricultural Sciences
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Prerequisites	No prerequisites.
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Contact time	3 lectures per week
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Language of tuition	Module is presented in English
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Department	Human Resource Management
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Period of presentation	Semester 2
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Module content

The theoretical basis of Labour Relations

In this section the basic concepts, historical context and theoretical approaches to the field of labour relations will be discussed. The institutional framework in which labour relations operates, will be addressed with particular emphasis on the structural mechanisms and institutional processes. The service relationship that forms the basis of labour relations practices, will also be analysed.

Labour Relations practice

In this section students are taught the conceptual and practical skills related to practice aspects such as handling of grievances, disciplining, retrenchments, collective bargaining, industrial action and dispute resolution.

Afrikaans 110 (AFR 110)

Qualification	Undergraduate
Module credits	12.00

Programmes	BA
	BA Extended programme
	BA Fine Arts
	BA Languages
	BA Law
	BCom Law
	BDiv
	BEd Foundation Phase Teaching
	BEd Intermediate Phase Teaching
	BEd Senior Phase and Further Education and Training Teaching
	BIS Information Science
	BIS Publishing
	LLB

Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Economic and Management Sciences Faculty of Law Faculty of Health Sciences
Prerequisites	No prerequisites.
Contact time	2 discussion classes per week, 2 lectures per week
Language of tuition	Module is presented in Afrikaans
Department	Afrikaans
Period of presentation	Semester 1

Module content

Taalkundekomponent: Inleiding tot die Afrikaanse taalkunde met klem op lees-en skryfvaardigheid.

Letterkundekomponent: Inleiding tot die Afrikaanse en Nederlandse letterkunde aan die hand van kortverhale en gedigte.

Afrikaans 120 (AFR 120)

Qualification	Undergraduate
Module credits	12.00
Programmes	BA
	BA Extended programme
	BA Fine Arts
	BA Languages
	BA Law
	BCom Law
	BDiv
	BEd Foundation Phase Teaching
	BEd Intermediate Phase Teaching
	BEd Senior Phase and Further Education and Training Teaching
	BIS Information Science
	BIS Publishing
	BPolSci Political Studies
	LLB

Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Economic and Management Sciences Faculty of Law Faculty of Health Sciences
Prerequisites	No prerequisites.
Contact time	2 discussion classes per week, 2 lectures per week
Language of tuition	Module is presented in Afrikaans
Department	Afrikaans
Period of presentation	Semester 2

Module content

Taalkundekomponent: Inleiding tot die Afrikaanse sintaksis, fonetiek en taalgeskiedenis.

Letterkundekomponent: Inleiding tot die Romankuns Inleiding tot die Drama

Afrikaans 210 (AFR 210)

Qualification	Undergraduate
Module credits	20.00
Programmes	BA Languages
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	No prerequisites.
Contact time	2 lectures per week
Language of tuition	Module is presented in Afrikaans
Department	Afrikaans
Period of presentation	Semester 1

Module content

Leer Nederlands

Die module het as uitkoms die verwerwing van lees-, praat-, skryf- en luistervaardighede in Nederlands. 'n Goeie kennis van Afrikaans is 'n voorvereiste. Die module is kontrastief. Klem word gelê op die verskille tussen die Afrikaanse en Nederlandse grammatika, woordeskat en kultuur.

Afrikaans 214 (AFR 214)

Qualification	Undergraduate
Module credits	20.00
Programmes	BA Languages BA Law BEd Foundation Phase Teaching BEd Intermediate Phase Teaching BEd Senior Phase and Further Education and Training Teaching BIS Publishing

Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education
Prerequisites	AFR 110 and AFR 120
Contact time	2 discussion classes per week, 2 lectures per week
Language of tuition	Module is presented in Afrikaans
Department	Afrikaans
Period of presentation	Semester 1

Module content

Taalkundekomponent: Morfologie, sintaksis, leksikologie en semantiek. *Letterkundekomponent:* Afrikaanse poësie

Afrikaans 220 (AFR 220)

Qualification	Undergraduate
Module credits	20.00

Programmes

- BA
- BA Languages
- BA Law
- BEd Foundation Phase Teaching
- BEd Intermediate Phase Teaching
- BEd Senior Phase and Further Education and Training Teaching
- BIS Publishing
- BPolSci Political Studies

Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education
Prerequisites	AFR 110 and AFR 120
Contact time	2 discussion classes per week, 2 lectures per week
Language of tuition	Module is presented in Afrikaans
Department	Afrikaans
Period of presentation	Semester 2

Module content

Afrikaanse prosa
Literatuurteorie en -kritiek

Afrikaans 311 (AFR 311)

Qualification	Undergraduate
Module credits	30.00

Programmes	BA BA Languages BA Law BEd Senior Phase and Further Education and Training Teaching BIS Publishing BPolSci Political Studies
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education
Prerequisites	AFR 214 and AFR 220
Contact time	2 discussion classes per week, 2 lectures per week
Language of tuition	Module is presented in Afrikaans
Department	Afrikaans
Period of presentation	Semester 1

Module content

Taalkundekomponent
Capita selecta uit die Afrikaanse taalkunde
Letterkundekomponent
Afrikaanse prosa

Afrikaans 321 (AFR 321)

Qualification	Undergraduate
Module credits	30.00

Programmes	BA BA Languages BA Law BEd Senior Phase and Further Education and Training Teaching BIS Publishing BPolSci Political Studies
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education
Prerequisites	AFR 214 and AFR 220
Contact time	2 discussion classes per week, 2 lectures per week
Language of tuition	Module is presented in Afrikaans
Department	Afrikaans
Period of presentation	Semester 2

Module content

Afrikaanse poësie
'n Keuse uit eietydse Nederlandstalige literatuur; analitiese teksondersoeke met aandag aan agtergrond- en resepsieaangeleenthede.
Die Afrikaanse drama word binne die breër konteks van die Afrikaanse letterkunde geplaas.

African languages literature: Capita selecta 121 (AFT 121)

Qualification Undergraduate

Module credits 12.00

Programmes BA
BA Extended programme
BA Languages
BA Law
BEd Foundation Phase Teaching
BEd Intermediate Phase Teaching
BEd Senior Phase and Further Education and Training Teaching
BIS Publishing

Service modules Faculty of Engineering, Built Environment and Information Technology
Faculty of Education

Prerequisites NDE 110/SEP 111/ZUL 111/STW 111

Contact time 2 lectures per week

Language of tuition Module presented in English and African Language

Department African Languages

Period of presentation Semester 2

Module content

Aspects of the literature of isiNdebele/isiZulu/Sepedi/Setswana such as an introduction to literary concepts such as literary text(s), topic, characters, events, time and place; the analysis of selected short stories.

African languages literature: Capita selecta 220 (AFT 220)

Qualification Undergraduate

Module credits 20.00

Programmes BA
BA Languages
BA Law
BEd Foundation Phase Teaching
BEd Intermediate Phase Teaching
BEd Senior Phase and Further Education and Training Teaching
BIS Publishing
BPolSci Political Studies

Service modules Faculty of Engineering, Built Environment and Information Technology
Faculty of Education

Prerequisites NDE 210/SEP 211/ZUL 211/STW 211

Contact time 2 lectures per week

Language of tuition Module presented in English and African Language

Department African Languages

Period of presentation Semester 2

Module content

Aspects of the literature of isiNdebele/isiZulu/Sepedi/Setswana such as the continuation of the study of concepts such as text, topic, characters, events, time and place; the study of plot and style; the critical analysis of a novel/novelette.

African languages literature: Capita selecta 320 (AFT 320)

Qualification	Undergraduate
Module credits	30.00
Programmes	BA BA Languages BA Law BEd Senior Phase and Further Education and Training Teaching BIS Publishing
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education
Prerequisites	NDE 310/SEP 310/ZUL 310/STW 310
Contact time	1 discussion class per week, 2 lectures per week
Language of tuition	Module presented in English and African Language
Department	African Languages
Period of presentation	Semester 2

Module content

Aspects of the literature of isiNdebele/isiZulu/Sepedi/Setswana such as the critical analysis of a dramatic work and poetry (selected poems).

Archaeology 110 (AGL 110)

Qualification	Undergraduate
Module credits	12.00
Programmes	BIS Information Science
Prerequisites	No prerequisites.
Contact time	1 tutorial per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Anthropology and Archaeology
Period of presentation	Semester 1

Module content

*Optional Field school usually in April

Introduction to Archaeology

An introduction as to how archaeologists study the past via the artefacts left behind by our ancestors. Basic introduction to archaeological theory and how it has contributed to interpretation of the past is discussed. Topics range from the origins of the human family in Africa over three million years ago to the study of more recent times.

Archaeology 120 (AGL 120)

Qualification	Undergraduate
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Module credits	12.00
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Programmes	BIS Information Science
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Prerequisites	No prerequisites.
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Contact time	1 tutorial per week, 2 lectures per week
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Language of tuition	Module is presented in English
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Department	Anthropology and Archaeology
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Period of presentation	Semester 2
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Module content

African and world archaeology

Africa is the home of humanity in both a biological and cultural sense and we have the artefacts and sites to prove it. Topics range from the famous 3 million year-old Australopithecine 'Lucy' ancestor found in Ethiopia to the 'Out of Africa' dispersal of modern humans, and the emergence of human symbolism, rock art and the emergence of complex societies at society at Lake Chad (Daima) and southern Africa (Mapungubwe and Great Zimbabwe). The main aim is to situate events in Africa in global perspective.

Academic information management 101 (AIM 101)

Qualification	Undergraduate
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Module credits	6.00
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Programmes

BA
BA Audiology
BA Extended programme
BA Fine Arts
BA Information Design
BA Languages
BA Speech-Language Pathology
BA Visual Studies
BDiv
BDram
BEd Foundation Phase Teaching
BEd Intermediate Phase Teaching
BEd Senior Phase and Further Education and Training Teaching
BIS Information Science
BIS Multimedia
BIS Publishing
BIT Information Systems
BMus
BMus Extended programme
BPolSci International Studies
BPolSci Political Studies
BRad in Diagnostics
BSW
BSc Computer Science
BSc Information and Knowledge Systems
BSocSci Heritage and Cultural Tourism
BSocSci Industrial Sociology and Labour Studies
BSocSci Philosophy, Politics and Economics
BTRP
BTh

Service modules

Faculty of Engineering, Built Environment and Information Technology
Faculty of Education
Faculty of Economic and Management Sciences
Faculty of Humanities
Faculty of Law
Faculty of Health Sciences
Faculty of Natural and Agricultural Sciences
Faculty of Theology and Religion
Faculty of Veterinary Science

Prerequisites

No prerequisites.

Contact time

2 lectures per week

Language of tuition

Module is presented in English

Department

Information Science

Period of presentation

Semester 1

Module content

Find, evaluate, process, manage and present information resources for academic purposes using appropriate technology. Apply effective search strategies in different technological environments. Demonstrate the ethical and fair use of information resources. Integrate 21st-century communications into the management of academic information.

Academic information management 102 (AIM 102)

Qualification	Undergraduate
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Module credits	6.00
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BA Law
 BConSci Clothing Retail Management
 BConSci Food Retail Management
 BConSci Hospitality Management
 BSc Actuarial and Financial Mathematics
 BSc Applied Mathematics
 BSc Architecture
 BSc Biochemistry
 BSc Biological Sciences
 BSc Biotechnology
 BSc Chemistry
 BSc Culinary Science
 BSc Ecology
 BSc Engineering and Environmental Geology
 BSc Entomology
 BSc Environmental Sciences
 BSc Food Science
 BSc Genetics
 BSc Geography
 BSc Geoinformatics
 BSc Geology
 BSc Human Genetics
 BSc Human Physiology
 BSc Human Physiology, Genetics and Psychology
 BSc Interior Architecture
 BSc Landscape Architecture
 BSc Mathematical Statistics
 BSc Mathematics
 BSc Medical Sciences
 BSc Meteorology
 BSc Microbiology
 BSc Nutrition
 BSc Physics
 BSc Plant Science
 BSc Zoology
 BScAgric Agricultural Economics and Agribusiness Management
 BScAgric Animal Science
 BScAgric Applied Plant and Soil Sciences
 BScAgric Plant Pathology
 BVSc
 LLB

Programmes

Service modules

Faculty of Education
 Faculty of Economic and Management Sciences
 Faculty of Humanities
 Faculty of Law
 Faculty of Health Sciences
 Faculty of Natural and Agricultural Sciences
 Faculty of Theology and Religion
 Faculty of Veterinary Science

Prerequisites

No prerequisites.

Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Semester 2

Module content

Find, evaluate, process, manage and present information resources for academic purposes using appropriate technology. Apply effective search strategies in different technological environments. Demonstrate the ethical and fair use of information resources. Integrate 21st-century communications into the management of academic information.

Academic information management 111 (AIM 111)

Qualification	Undergraduate
Module credits	4.00

Programmes

BA
BA Extended programme
BA Fine Arts
BA Languages
BA Law
BA Visual Studies
BAdmin Public Management and International Relations
BCMP
BChD
BCom
BCom Accounting Sciences
BCom Agribusiness Management
BCom Business Management
BCom Econometrics
BCom Economics
BCom Extended programme
BCom Financial Sciences
BCom Human Resource Management
BCom Informatics Information Systems
BCom Investment Management
BCom Law
BCom Marketing Management
BCom Statistics
BCom Statistics and Data Science
BCom Supply Chain Management
BConSci Clothing Retail Management
BConSci Food Retail Management
BConSci Hospitality Management
BDietetics
BDiv
BDram
BEd Foundation Phase Teaching
BEd Intermediate Phase Teaching
BEd Senior Phase and Further Education and Training Teaching
BIS Multimedia
BIS Publishing
BIT Information Systems
BNurs
BOH
BOccTher
BPhysio
BPolSci International Studies
BPolSci Political Studies
BRad in Diagnostics
BSW
BSc Actuarial and Financial Mathematics
BSc Applied Mathematics
BSc Architecture
BSc Biochemistry
BSc Biological Sciences
BSc Biotechnology
BSc Chemistry
BSc Computer Science
BSc Construction Management
BSc Culinary Science
BSc Ecology
BSc Engineering and Environmental Geology
BSc Entomology
BSc Environmental Sciences
BSc Extended programme - Biological and Agricultural Sciences
BSc Extended programme - Mathematical Sciences
BSc Extended programme - Physical Sciences
BSc Food Science
BSc Genetics
BSc Geography
BSc Geoinformatics
BSc Geology
BSc Human Genetics
BSc Human Physiology
BSc Human Physiology, Genetics and Psychology
BSc Information and Knowledge Systems
BSc Interior Architecture
BSc Landscape Architecture
BSc Mathematical Statistics
BSc Mathematics
BSc Medical Sciences
BSc Meteorology
BSc Microbiology
BSc Nutrition
BSc Physics
BSc Plant Science
BSc Quantity Surveying
BSc Real Estate
BSc Zoology
BScAgric Agricultural Economics and Agribusiness Management
BScAgric Animal Science
BScAgric Applied Plant and Soil Sciences
BScAgric Plant Pathology
BSocSci Heritage and Cultural Tourism
BSocSci Industrial Sociology and Labour Studies
BSocSci Philosophy, Politics and Economics
BSportSci
BTRP
BTh
BVetNurs
Diploma in Theology
MBChB

Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Economic and Management Sciences Faculty of Humanities Faculty of Law Faculty of Health Sciences Faculty of Natural and Agricultural Sciences Faculty of Theology and Religion
Prerequisites	No prerequisites.
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Semester 1

Module content

Find, evaluate, process, manage and present information resources for academic purposes using appropriate technology.

Academic information management 121 (AIM 121)

Qualification	Undergraduate
Module credits	4.00

Programmes

BA
BA Extended programme
BA Fine Arts
BA Languages
BA Law
BA Visual Studies
BAdmin Public Management and International Relations
BCMP
BChD
BCom
BCom Accounting Sciences
BCom Agribusiness Management
BCom Business Management
BCom Econometrics
BCom Economics
BCom Extended programme
BCom Financial Sciences
BCom Human Resource Management
BCom Informatics Information Systems
BCom Investment Management
BCom Law
BCom Marketing Management
BCom Statistics
BCom Statistics and Data Science
BCom Supply Chain Management
BConSci Clothing Retail Management
BConSci Food Retail Management
BConSci Hospitality Management
BDietetics
BDiv
BDram
BEd Foundation Phase Teaching
BEd Intermediate Phase Teaching
BEd Senior Phase and Further Education and Training Teaching
BIS Multimedia
BIS Publishing
BIT Information Systems
BNurs
BOH
BOccTher
BPhysio
BPolSci International Studies
BPolSci Political Studies
BRad in Diagnostics
BSW
BSc Actuarial and Financial Mathematics
BSc Applied Mathematics
BSc Architecture
BSc Biochemistry
BSc Biological Sciences
BSc Biotechnology
BSc Chemistry
BSc Computer Science
BSc Construction Management
BSc Culinary Science
BSc Ecology
BSc Engineering and Environmental Geology
BSc Entomology
BSc Environmental Sciences
BSc Extended programme - Biological and Agricultural Sciences
BSc Extended programme - Mathematical Sciences
BSc Extended programme - Physical Sciences
BSc Food Science
BSc Genetics
BSc Geography
BSc Geoinformatics
BSc Geology
BSc Human Genetics
BSc Human Physiology
BSc Human Physiology, Genetics and Psychology
BSc Information and Knowledge Systems
BSc Interior Architecture
BSc Landscape Architecture
BSc Mathematical Statistics
BSc Mathematics
BSc Medical Sciences
BSc Meteorology
BSc Microbiology
BSc Nutrition
BSc Physics
BSc Plant Science
BSc Quantity Surveying
BSc Real Estate
BSc Zoology
BScAgric Agricultural Economics and Agribusiness Management
BScAgric Animal Science
BScAgric Applied Plant and Soil Sciences
BScAgric Plant Pathology
BSocSci Heritage and Cultural Tourism
BSocSci Industrial Sociology and Labour Studies
BSocSci Philosophy, Politics and Economics
BSportSci
BTRP
BTh
BVetNurs
Diploma in Theology
MBChB

Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Economic and Management Sciences Faculty of Humanities Faculty of Law Faculty of Health Sciences Faculty of Natural and Agricultural Sciences Faculty of Theology and Religion Faculty of Veterinary Science
Prerequisites	No prerequisites.
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Informatics
Period of presentation	Semester 2

Module content

Apply effective search strategies in different technological environments. Demonstrate the ethical and fair use of information resources. Integrate 21st-century communications into the management of academic information.

Academic literacy for Information Technology 121 (ALL 121)

Qualification Undergraduate

Module credits 6.00

Programmes

[BCom Informatics Information Systems](#)
[BIS Information Science](#)
[BIS Multimedia](#)
[BIS Publishing](#)
[BIT Information Systems](#)
[BSc Computer Science](#)
[BSc Information and Knowledge Systems](#)

Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Economic and Management Sciences
Prerequisites	No prerequisites.
Contact time	1 web-based period per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Unit for Academic Literacy
Period of presentation	Semester 2

Module content

By the end of this module students should be able to cope more confidently and competently with the reading, writing and critical thinking demands that are characteristic of the field of Information Technology.

Academic literacy for Construction Economics 122 (ALL 122)

Qualification Undergraduate

Module credits 6.00

Programmes

[BSc Construction Management](#)
[BSc Quantity Surveying](#)
[BSc Real Estate](#)

Service modules	Faculty of Engineering, Built Environment and Information Technology
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Prerequisites	No prerequisites.
Contact time	1 web-based period per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Unit for Academic Literacy
Period of presentation	Semester 1

Module content

By the end of this module students should be able to cope more confidently and competently with the reading, writing and critical thinking demands that are characteristic of the field of Construction Economics.

Academic literacy for Town and Regional Planning 123 (ALL 123)

Qualification	Undergraduate
Module credits	6.00
Programmes	BTRP
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	No prerequisites.
Contact time	1 web-based period per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Unit for Academic Literacy
Period of presentation	Semester 1

Module content

By the end of this module students should be able to cope more confidently and competently with the reading, writing and critical thinking demands that are characteristic of the field of Town and Regional Planning.

Digital visual communication 110 (ARC 110)

Qualification	Undergraduate
Module credits	6.00
Programmes	BSc Architecture BSc Interior Architecture BSc Landscape Architecture
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Architecture
Period of presentation	Semester 1

Module content

Basic overview and understanding of digital architectural visualisation using tools such as prescribed open source photo editing software that enhances hand drawing techniques.

Dissertation: Architecture 890 (ARG 890)

Qualification	Postgraduate
Module credits	180.00
Programmes	MArch
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Architecture
Period of presentation	Year

Mini-dissertation 895 (ARG 895)

Qualification	Postgraduate
Module credits	110.00
Programmes	MSc Applied Science Architecture (Coursework)
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Architecture
Period of presentation	Year

Thesis: Architecture 990 (ARG 990)

Qualification	Postgraduate
Module credits	360.00
Programmes	PhD Architecture
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Architecture
Period of presentation	Year

Industrial analysis 313 (BAN 313)

Qualification	Undergraduate
Module credits	8.00
Programmes	BEng Industrial Engineering BEng Industrial Engineering ENGAGE
Prerequisites	BES 220
Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	Industrial and Systems Engineering

Period of presentation	Semester 1
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Module content

Mathematical statistics provides the basis for a number of important applications in the engineering environment. This module provides an introduction to the most important of these applications and will include the following syllabus themes: Monte Carlo simulation, decision analysis, forecasting and data-dependent modelling.

Industrial analysis 780 (BAN 780)

Qualification	Postgraduate
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Module credits	16.00
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Programmes	BScHons Applied Science Industrial Systems BScHons Financial Engineering
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Service modules	Faculty of Natural and Agricultural Sciences
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Prerequisites	Not for Industrial Engineering students
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Contact time	24 contact hours per semester
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Language of tuition	Module is presented in English
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Department	Industrial and Systems Engineering
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Period of presentation	Semester 1 or Semester 2
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Module content

- Monte Carlo Simulation
- Continuous Simulation
- System Dynamics
- Multi-objective Decision-making
- Operations Research
- Decision Analysis
- Discrete Simulation

Advanced aspects of operations research 780 (BAO 780)

Qualification	Postgraduate
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Module credits	16.00
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Prerequisites	No prerequisites.
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Contact time	24 contact hours
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Language of tuition	Module is presented in English
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Department	Industrial and Systems Engineering
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Period of presentation	Semester 1 or Semester 2
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Module content

Decision makers are frequently faced with complex problem environments. The module introduces two advanced topics in the field of Operations Research that can assist in the development of more relevant decision support models. The first topic deals with multi objectivity and introduces a variety of interventions to incorporate the competing objectives into mathematical programming models. Secondly, the topic of Data Envelopment Analysis (DEA) is introduced, a non-parametric method used to empirically measure the productive efficiency of decision-making units. This linear programming methodology allows the decision maker to measure the productivity in complex environments with multiple inputs and outputs; uncover often overlooked relationships between in- and outputs; and analyse and quantify the inefficiencies of every unit evaluated.

Solution algorithms in operations research 780 (BAR 780)

Qualification	Postgraduate
Module credits	32.00
Prerequisites	BAN 313 or BAN 780
Contact time	2 other contact sessions per week
Language of tuition	Module is presented in English
Department	Industrial and Systems Engineering
Period of presentation	Semester 1 or Semester 2

Module content

When developing decision-support models using optimisation, the computational burden is often so great that exact optimal solutions are not attainable, or not efficiently found, especially in combinatorial and discrete optimisation problems. Often approximate solutions are adequate and can provide superior solutions to the current state-of-practice decision approaches. The module introduces a selection of heuristics and metaheuristics applied to a variety of problems frequently faced by Industrial Engineers. The module also introduces a methodology to test and validate heuristics to ensure robust and reliable application.

Enterprise engineering and research methods 781 (BBA 781)

Qualification	Postgraduate
Module credits	32.00
Programmes	BEngHons Industrial Engineering BScHons Applied Science Industrial Systems
Prerequisites	Information Systems Design (BID 320) or similar course
Contact time	36 contact hours per semester
Language of tuition	Module is presented in English
Department	Industrial and Systems Engineering
Period of presentation	Semester 1

Module content

Enterprise Engineering can be defined as the body of knowledge, principles, and practices to design an enterprise. Due to their complexity and the continuously changing environment, enterprises need new approaches, tools and techniques to deliver innovative products and services to new markets in competitive environments. This module offers an introduction to the engineering design process applied to the enterprise as a system, and present existing approaches for designing, aligning and governing the enterprise. Within the design paradigm, the module also offers research methods (e.g. design research and action research) that are relevant for doing research within the enterprise engineering discipline.

The module covers:

- Background on systems thinking
- Systems design and systems engineering
- Prominent approaches for creating an enterprise engineering capability (e.g. Zachman, The Open Group, Dietz/Hoogervorst).
- Mechanisms and practices associated with different phases of enterprise design (e.g. enterprise modelling, languages, road maps, maturity assessment etc.)
- Research methods and techniques to validate and extend the EE knowledge base
- Case studies
- Change management

Supply chain information and decision technology 780 (BCI 780)

Qualification	Postgraduate
Module credits	16.00
Prerequisites	No prerequisites.
Contact time	24 contact hours
Language of tuition	Module is presented in English
Department	Industrial and Systems Engineering
Period of presentation	Semester 1 or Semester 2

Module content

Information technology is an important enabler of effective supply chain management, typically spanning the extended value chain from suppliers to customers. The timeliness and availability of relevant information are critical when applying supply chain strategies that increase service levels of and reduce cost and lead times. Value-added IT-based services are increasingly used to differentiate and develop relationships with customers. The objective of the course is to develop a sound understanding of components and priorities IT investment to enable supply chain integration and efficiency, the impact of business process change on IT implementation and selection of decision support systems.

- The Value of Information
- Leveraging Financial Information
- Advanced Supply Chain Planning and Execution
- Decision Support Systems
- IT Capabilities for Supply Chain Excellence
- Enterprise Resource Planning Systems
- Advanced Planning and Scheduling Systems
- Identification Technology
- Integrating Supply Chain IT

Industrial and systems engineering research 780 (BCS 780)

Qualification	Postgraduate
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Module credits	32.00
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Programmes	BEngHons Industrial Engineering BScHons Applied Science Industrial Systems
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Prerequisites	Any one of the following modules: BAR 780,BBA 781,BGH 780,BLK 781,BOZ 780,BPZ 782,BUY 780,BVK 780
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Contact time	36 contact hours per semester
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Language of tuition	Module is presented in English
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Department	Industrial and Systems Engineering
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Period of presentation	Semester 1 or Semester 2
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Module content

*This is a compulsory research module.

The module affords an individual student the opportunity of studying a designated area of coherent advanced knowledge under the tutorship of a senior staff member of the Department of Industrial and Systems Engineering. Eligibility, topic and scope of the intended project must be determined in consultation with the proposed supervisor.

Design and analysis of experiments 780 (BDE 780)

Qualification	Postgraduate
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Module credits	16.00
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Prerequisites	No prerequisites.
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Contact time	24 contact hours
Language of tuition	Module is presented in English
Department	Industrial and Systems Engineering
Period of presentation	Semester 1 or Semester 2

Module content

The design of an experiment may be defined as ‘the logical construction of an experiment in which the degree of uncertainty with which the inferences are drawn may be well defined’. The module deals with the following:

- Principles of experimental design (Randomisation, Replication and Blocking (local control))
- One-Factor-Two-level Factorial Designs
- One-Factor-Multi-level Factorial Designs
- Completely Randomised Design (CRD) and introduction to ANOVA
- Randomised Complete Block Design (RBD)
- Latin Square Design (LSD)
- Balanced Incomplete Block Design (BIBD)
- Factorial Experiments (2nd and 3rd factorial experiments)
- Blocking and Confounding in Factorial designs
- Overview of Factorial Designs

Industrial and organisational psychology 229 (BDO 229)

Qualification	Undergraduate
Module credits	16.00
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Health Sciences
Prerequisites	BDO 219 GS
Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	Human Resource Management
Period of presentation	Semester 2

Module content

*Only for BCur students

Inventory modelling 780 (BEE 780)

Qualification	Postgraduate
Module credits	16.00
Prerequisites	No prerequisites.
Contact time	24 contact hours
Language of tuition	Module is presented in English
Department	Industrial and Systems Engineering

Period of presentation Semester 1 or Semester 2

Module content

- Theory of Inventory Systems:

Inventory models and modelling including time and certainty complexities, linear and non-linear systems and feedback systems

- Review of inventory models:

Types and representations (classic, shortage, capacity constraint, time value of money, deterioration, time varying, stochastic inputs, imperfect quality, integrated scheduling and lot sizing models, service systems and retrieval queues)

- Review of important inventory papers, their approaches and their foci:

- Modelling and Solution techniques:

Characterisation and assumptions

Mathematical Modelling, Mathematical Programming, Heuristics, Simulation Models, Control Theory and other approaches

- State of the art of modelling:

Current challenges and research trends

- Technological solutions of inventory modelling and management:

Algorithms and software, integration to MRP, ERP and scheduling modules, integration to WMS modules, and demonstrations

Taxation 200 (BEL 200)

Qualification Undergraduate

Module credits 32.00

Programmes [BCom](#)
[BCom Accounting Sciences](#)
[BCom Financial Sciences](#)
[BCom Informatics Information Systems](#)
[BCom Law](#)
[BIT Information Systems](#)

Service modules Faculty of Engineering, Built Environment and Information Technology

Prerequisites FRK 111 and FRK 121 or FRK 100 or FRK 101. Only available to BCom (Option Taxation, Accounting Sciences, Financial Management Sciences, Financial Sciences, Informatics, Investment Management and Law) students.

Contact time 1 practical per week, 3 lectures per week

Language of tuition Module is presented in English

Department Taxation

Period of presentation Year

Module content

In this module an introduction to taxation as a discipline in the South African tax environment is provided. The income tax concepts covered in this module are gross income, special inclusions, exempt income, general deductions, special deductions, prohibited deductions and allowed assessed losses. The implications of a capital gains tax event, specific sections of the Income Tax Act applicable on individuals as well as fringe benefits and specific allowances for individuals are discussed. Concepts such as the prepaid tax system, tax implications of donations tax events as well as the tax implications of a deceased person will be covered. Finally an introduction to the basic principles of VAT is included.

Taxation 300 (BEL 300)

Qualification	Undergraduate
Module credits	40.00
Programmes	BCom BCom Accounting Sciences BCom Financial Sciences BCom Informatics Information Systems BCom Law BIT Information Systems
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	BEL 200 and FRK 221 or FRK 201
Contact time	1 discussion class per week, 4 lectures per week
Language of tuition	Module is presented in English
Department	Taxation
Period of presentation	Year

Module content

The purpose of the module is to enable the learner to calculate the value-added tax liability and to journalise transactions; calculate the normal tax liability (including the determination of taxable capital gains and assessed capital losses) of individuals, companies, estates and trusts, discuss tax principles on value-added tax and normal tax; and calculate and discuss provisional and employees' tax and to object against an assessment.

Marketing management 120 (BEM 120)

Qualification	Undergraduate
Module credits	10.00

Programmes	BA Visual Studies
	BCom
	BCom Agribusiness Management
	BCom Business Management
	BCom Informatics Information Systems
	BCom Marketing Management
	BCom Supply Chain Management
	BConSci Clothing Retail Management
	BConSci Food Retail Management
	BConSci Hospitality Management
	BIS Publishing
	BSc Culinary Science
	BSc Information and Knowledge Systems

Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Humanities Faculty of Natural and Agricultural Sciences
Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	Marketing Management
Period of presentation	Semester 2

Module content

This module provides an overview of the fundamentals of marketing by considering the exchange process, customer value, marketing research and the development of a marketing plan. It also addresses the marketing mix elements with specific focus on the seven service marketing elements namely the service product, physical evidence, people, process, distribution, pricing and integrated marketing communication.

Consumer behaviour 212 (BEM 212)

Qualification	Undergraduate
Module credits	16.00
Programmes	BA Visual Studies
	BCom
	BCom Business Management
	BCom Informatics Information Systems
	BCom Marketing Management
	BCom Supply Chain Management
	BConSci Clothing Retail Management
	BConSci Food Retail Management
	BConSci Hospitality Management
	BSc Culinary Science
	BSc Information and Knowledge Systems
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Humanities Faculty of Natural and Agricultural Sciences
Prerequisites	BEM 120 GS

Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	Marketing Management
Period of presentation	Semester 1

Module content

Internal and external influencing factors of consumer behaviour, the consumer's decision process and application fields of consumer behaviour, consumerisms and social responsibility, buying behaviour of consumers in both product and service related industries, consumer psychology and the influence thereof on buying behaviour, psychology of pricing, influencing factors in consumer buying behaviour, the impact of various forms of marketing communication on buying behaviour.

Marketing management 321 (BEM 321)

Qualification	Undergraduate
Module credits	20.00

Programmes

- BA Visual Studies
- BCom
- BCom Informatics Information Systems
- BCom Marketing Management
- BConSci Clothing Retail Management
- BConSci Food Retail Management

Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Humanities Faculty of Natural and Agricultural Sciences
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Prerequisites	BEM 120
Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	Marketing Management
Period of presentation	Semester 2

Module content

Strategic issues in marketing, strategic marketing, strategic analysis (market analysis, customer analysis, competitor analysis and internal analysis), market strategies (competitive strategies, strategies in the product life cycle and relationship building strategies) and strategy implementation and control.

Business law 210 (BER 210)

Qualification	Undergraduate
Module credits	16.00

Programmes	BCom BCom Agribusiness Management BCom Business Management BCom Economics BCom Financial Sciences BCom Human Resource Management BCom Informatics Information Systems BCom Marketing Management BCom Supply Chain Management BConSci Clothing Retail Management BConSci Food Retail Management BConSci Hospitality Management BSc Geoinformatics BScAgric Agricultural Economics and Agribusiness Management
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Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Economic and Management Sciences Faculty of Natural and Agricultural Sciences
Prerequisites	No prerequisites.
Contact time	1 discussion class per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Mercantile Law
Period of presentation	Semester 1
Module content	Basic principles of law of contract. Law of sales, credit agreements, lease.

Business law 220 (BER 220)

Qualification	Undergraduate
Module credits	16.00
Programmes	BCom BCom Agribusiness Management BCom Business Management BCom Economics BCom Financial Sciences BCom Human Resource Management BCom Informatics Information Systems BCom Supply Chain Management BConSci Clothing Retail Management BConSci Food Retail Management

Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Economic and Management Sciences Faculty of Natural and Agricultural Sciences
Prerequisites	Examination entrance for BER 210
Contact time	1 discussion class per week, 2 lectures per week

Language of tuition	Module is presented in English
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Department	Mercantile Law
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Period of presentation	Semester 2
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Module content

Labour law. Aspects of security law. Law of insolvency. Entrepreneurial law; company law, law concerning close corporations. Law of partnerships.

Business law 310 (BER 310)

Qualification	Undergraduate
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Module credits	10.00
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Programmes	BEng Industrial Engineering BEng Industrial Engineering ENGAGE BSc Construction Management BSc Quantity Surveying BSc Real Estate
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Service modules	Faculty of Engineering, Built Environment and Information Technology
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Prerequisites	No prerequisites.
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Contact time	4 lectures per week
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Language of tuition	Separate classes for Afrikaans and English
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Department	Mercantile Law
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Period of presentation	Semester 1
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Module content

Introduction to law. General principles of the law of contract. Specific contracts: purchase contracts; letting and hiring of work; employment contracts. Agency. General aspects of entrepreneurial law.

Engineering statistics 220 (BES 220)

Qualification	Undergraduate
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Module credits	8.00
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Programmes	BEng Chemical Engineering
	BEng Chemical Engineering ENGAGE
	BEng Civil Engineering
	BEng Civil Engineering ENGAGE
	BEng Computer Engineering
	BEng Computer Engineering ENGAGE
	BEng Electrical Engineering
	BEng Electrical Engineering ENGAGE
	BEng Electronic Engineering
	BEng Electronic Engineering ENGAGE
	BEng Industrial Engineering
	BEng Industrial Engineering ENGAGE
	BEng Mechanical Engineering
	BEng Mechanical Engineering ENGAGE
	BEng Metallurgical Engineering
	BEng Metallurgical Engineering ENGAGE
	BEng Mining Engineering
	BEng Mining Engineering ENGAGE

Prerequisites	WTW 158 GS, WTW 164 GS
Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	Industrial and Systems Engineering
Period of presentation	Semester 2

Module content

Engineering systems are often subjected to variation, uncertainty and incomplete information. Mathematical statistics provides the basis for effectively handling and quantifying the effect of these factors. This module provides an introduction to the concepts of mathematical statistics and will include the following syllabus themes: data analysis, probability theory, stochastic modelling, statistical inference and regression analysis.

Applied engineering statistics 780 (BES 780)

Qualification	Postgraduate
Module credits	16.00
Prerequisites	No prerequisites.
Contact time	24 contact hours
Language of tuition	Module is presented in English
Department	Industrial and Systems Engineering
Period of presentation	Semester 1 or Semester 2

Module content

This module presents an applied approach to solve real-world engineering problems. The premise of the course is that data analysis, and thus, applied statistics, is an inseparable part of conducting research and solving engineering problems. The module presents the elements of different types of statistical studies as they relate to different industrial settings. The aim of the module is to promote inductive reasoning through the gathering, analysing and interpreting of diverse types of observational data. The outcome of the module is an engineer equipped to select and apply statistical methods appropriate to an industrial setting.

The course covers the following topics:

- Contextualisation: Different types of industrial processes and research settings, related types of statistical studies and a framework for understanding and applying statistics
- Principles of probabilistic and rational data gathering
- The use of common and specialised probability distributions (such as the Gamma, Exponential and Weibull distributions) in solving real-life problems, conducting scientific research and analysing stochastic and deterministic processes
- Data transformations: When and how to transform data
- Bridging the gap between technology and statistical analysis: The use of EXCEL in resolving basic and advanced statistical problems

Facilities planning 320 (BFB 320)

Qualification	Undergraduate
Module credits	8.00
Programmes	BEng Industrial Engineering BEng Industrial Engineering ENGAGE
Prerequisites	No prerequisites.
Contact time	1 discussion class per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Industrial and Systems Engineering
Period of presentation	Semester 2

Module content

This module introduces the principles, approaches, methods, techniques and tools to systematically determine facility requirements, determine the required space of and relationships between activities, develop and evaluate alternative plans and layouts and present the results. Aspects such as facilities location, manufacturing and service process design, capacity planning, materials handling, personnel facilities, storage and warehousing are also addressed. A structured facility design project forms an integral part of the course.

Quality assurance 410 (BGC 410)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Industrial Engineering BEng Industrial Engineering ENGAGE
Prerequisites	No prerequisites.

Contact time	4 lectures per week
Language of tuition	Separate classes for Afrikaans and English
Department	Industrial and Systems Engineering
Period of presentation	Semester 1

Module content

Introduction to quality and quality management systems. Statistical process control. Acceptance control.

Building organisation 121 (BGG 121)

Qualification	Undergraduate
Module credits	4.00
Programmes	BSc Construction Management BSc Quantity Surveying BSc Real Estate

Prerequisites No prerequisites.

Contact time	1 lecture per week
Language of tuition	Module is presented in English
Department	Construction Economics
Period of presentation	Semester 1

Module content

The structure of the building industry and the role of building disciplines and related parties. Content from Humanities and social sciences 120 to introduce students to a variety of texts and encouraged them to understand themselves as products of – and participants in – different traditions, ideas and values.

Quality management 780 (BGH 780)

Qualification	Postgraduate
Module credits	16.00
Prerequisites	No prerequisites.
Contact time	24 contact hours
Language of tuition	Module is presented in English
Department	Industrial and Systems Engineering
Period of presentation	Semester 1 or Semester 2

Module content

Professionally, engineers are confronted with issues related to product quality and performance or organisational excellence. The intention of this course is to provide an overview of the domain of modern quality management and to equip the student with theory, methodologies and tools and techniques to improve and achieve product quality and performance excellence.

The course covers the following topics;

- Contextualisation: The History, Guru's, Principles, Industrial setting and the Domain of Quality Management
- Practices of improving and achieving product quality: Role in Industrial Engineering, On-line and Off-line Quality Control Practices
- Frameworks of improving organisational excellence: National Quality Awards, ISO 9000 and other frameworks
- Practices of improving performance excellence: Quality and Competitive advantage, Customer and Supplier relationships, People Empowerment and Motivation, Quality Leadership and Organisational change.

Health and safety in the workplace 780 (BGW 780)

Qualification	Postgraduate
Module credits	16.00
Prerequisites	No prerequisites.
Contact time	24 contact hours per semester
Language of tuition	Module is presented in English
Department	Industrial and Systems Engineering
Period of presentation	Semester 1

Probability models 780 (BHM 780)

Qualification	Postgraduate
Module credits	16.00
Prerequisites	No prerequisites.
Contact time	24 contact hours per semester
Language of tuition	Module is presented in English
Department	Industrial and Systems Engineering
Period of presentation	Semester 1 or Semester 2

Module content

The objective of the module is that students be exposed to probability theory, learn the ability to follow fairly involved theoretical reasoning, continue to learn how to reason mathematically, and solve problems of a more practical nature.

It covers:

- Probability theory: Random variables and random vectors, Sequence of random variables, Transformation of Probability distributions
- Stochastic Processes: Examples of stochastic processes; various types of stochastic processes
- Poisson Processes: Homogeneous and non-homogeneous stochastic processes with examples
- Renewal Processes: Renewal functions; ordinary and delayed renewal processes; Regenerative stochastic processes
- Discrete-time Markov chains: continuous time Markov chains with focus on examples in Reliability, queuing and inventory models.

Housing 320 (BHU 320)

Qualification	Undergraduate
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Module credits	6.00
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Programmes	BSc Construction Management BSc Quantity Surveying BSc Real Estate
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Prerequisites	No prerequisites.
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Contact time	2 lectures per week
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Language of tuition	Afrikaans and English are used in one class
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Department	Construction Economics
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Period of presentation	Semester 2
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Module content

Concepts, principles, history, current trends in settlement, shelter and integrated living environments; role of housing in society; statutory policy and planning frameworks and paradigms; housing delivery options; housing development management; financing and property rights options; housing types and densities; housing product, norms and standards; management and maintenance of social housing stock; housing needs assessment and post-occupancy evaluation; consumer education and protection.

Dissertation: Library science 890 (BIB 890)

Qualification	Postgraduate
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Module credits	180.00
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Programmes	MIS Library Science
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Prerequisites	No prerequisites.
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Language of tuition	Module is presented in English
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Department	Information Science
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Period of presentation	Year
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Thesis: Library science 990 (BIB 990)

Qualification	Postgraduate
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Module credits	360.00
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Programmes	PhD Library Science
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Prerequisites	No prerequisites.
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Language of tuition	Module is presented in English
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Department	Information Science
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Period of presentation	Year
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Information systems design 320 (BID 320)

Qualification	Undergraduate
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Module credits	16.00
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Programmes	BEng Industrial Engineering BEng Industrial Engineering ENGAGE
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Prerequisites	No prerequisites.
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Contact time	1 tutorial per week, 2 practicals per week, 3 lectures per week
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Language of tuition	Module is presented in English
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Department	Industrial and Systems Engineering
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Period of presentation	Semester 2
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Module content

Systems development planning, system requirement analysis, different approaches towards structured analysis and design of systems, process design, database design and normalization, object-oriented design and modelling, information system application building and testing.

Engineering economics 420 (BIE 420)

Qualification	Undergraduate
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Module credits	8.00
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Programmes	BEng Industrial Engineering BEng Industrial Engineering ENGAGE
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Prerequisites	No prerequisites.
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Contact time	1 discussion class per week, 2 lectures per week
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Language of tuition	Separate classes for Afrikaans and English
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Department	Industrial and Systems Engineering
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Period of presentation	Semester 2
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Module content

Money-time relationships and equivalence (interest formulae, effective interest rate, bonds and loans). Bases for comparison of alternatives (present worth, annual worth, Internal rate of return, external rate of return, investment balance diagrams, Decision making among alternatives (useful lives equal to study period, useful lives different among alternatives, mutually exclusive alternatives in terms of combinations of proposals). The influence of inflation on engineering economic calculations. Decision making among alternatives on an after-tax basis. Replacement analysis (the economic life of an asset, retirement without replacement). Risk analysis of cash flows.

Dissertation: Industrial engineering 890 (BIR 890)

Qualification	Postgraduate
Module credits	180.00
Programmes	MEng Industrial Engineering
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Industrial and Systems Engineering
Period of presentation	Year

Dissertation 891 (BIR 891)

Qualification	Postgraduate
Module credits	180.00
Programmes	MSc Applied Science Industrial Systems
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Industrial and Systems Engineering
Period of presentation	Year

Thesis: Industrial engineering 990 (BIR 990)

Qualification	Postgraduate
Module credits	360.00
Programmes	PhD Industrial Engineering
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Industrial and Systems Engineering
Period of presentation	Year

Information systems 780 (BIS 780)

Qualification	Postgraduate
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Module credits	16.00
Prerequisites	No prerequisites.
Contact time	24 contact hours
Language of tuition	Module is presented in English
Department	Industrial and Systems Engineering
Period of presentation	Semester 1 or Semester 2

Module content

To introduce the student with a background in transactional application software development to a variety of aspects in the wider field of information technology. Emphasis is on the functional design of Business Intelligence systems from an Industrial Engineering perspective. The aim is to enable the student to appreciate the scope of management challenges in the integrated environment of business processes, transactional application software, data, IT infrastructure and telecommunications, data warehousing, and the necessary management information needed at various levels in an organisation.

It covers:

- Technology trends
- Context diagram of application software portfolio
- Review of typical transactional information systems
- Role of Business Intelligence and data warehousing
- Business dimensional lifecycle
- Business requirement definition
- Basic elements of the data warehouse
- Extraction, Transformation and Loading processes
- Dimensional modelling (star schema)
- Metadata
- Information delivery

Thesis: Industrial systems 990 (BIT 990)

Qualification	Postgraduate
Module credits	360.00
Programmes	PhD Industrial Systems
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Industrial and Systems Engineering
Period of presentation	Year

Professional and technical communication 210 (BJJ 210)

Qualification	Undergraduate
Module credits	8.00
Programmes	BEng Industrial Engineering BEng Industrial Engineering ENGAGE

Prerequisites	No prerequisites.
Contact time	1 discussion class per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Industrial and Systems Engineering
Period of presentation	Semester 1

Module content

Communicate effectively, both orally and in writing, with engineering audiences and the community at large. Written communication as evidenced by: uses appropriate structure, use of modern or electronic communication methods; style and language for purpose and audience; uses effective graphical support; applies methods of providing information for use by others involved in engineering activity; meets the requirements of the target audience. Effective oral communication as evidenced by appropriate structure, style and language; appropriate visual materials; delivers fluently; meets the requirements of the intended audience. Audiences range from engineering peers, management and lay persons, using appropriate academic or professional discourse. Typed reports range from short (300-1 000 word plus tables diagrams) to long (10 000-15 000 words plus tables, diagrams, references and appendices), covering material at exit level. Methods of providing information include the conventional methods of the discipline, for example engineering drawings, as well as subject-specific methods.

Building cost estimation 700 (BKR 700)

Qualification	Postgraduate
Module credits	20.00
Programmes	BScHons Quantity Surveying BScHons Real Estate Retail Property
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Construction Economics
Period of presentation	Year

Module content

Estimation of building costs – principles and process; elements of a price; rough quantities and inclusive quantities (elemental and builders' quantities) for estimating; estimating methods; pricing of various trades and preliminaries; analysis of building cost; building cost escalation; design cost management.

Lean supply chain strategies and systems 780 (BLC 780)

Qualification	Postgraduate
Module credits	16.00
Prerequisites	No prerequisites.
Contact time	24 contact hours
Language of tuition	Module is presented in English

Department	Industrial and Systems Engineering
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Period of presentation	Semester 1 or Semester 2
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Module content

Supply chain executives need to contribute and support long term strategic objectives by providing a competitive edge through an aligned supply chain strategy. The course addresses the impact of lean principles in supply chain management and practical approach to implementing lean thinking and demand driven supply chains. The course provides a framework for the strategic supply chain decisions, both in designing and managing an efficient extended supply chain. The latest innovations, trends and challenges in agile supply chain strategies and systems are reviewed. Team leadership skills are developed through practical applications, approaches and best practices of lean supply chain design and management. Supply chain leadership perspectives will be provided by executives and managers from industry and team-based simulation games.

Course outline:

- Fundamentals of lean management
- Lean Thinking and Supply Chain (SC) management
- Customer Value
- Network design strategies
- Supply Chain Integration and barriers to Integration
- SC performance measurement
- Extended Value Chain and Value Stream Mapping
- Eliminating Waste in the Supply Chain
- Applying Lean Principles to Supply Chain Operations
- Inventory positioning approaches
- Operational Executive Problems
- A3 Performance Management

Industrial logistics 320 (BLK 320)

Qualification	Undergraduate
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Module credits	16.00
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Programmes	BEng Industrial Engineering BEng Industrial Engineering ENGAGE
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Prerequisites	(BOB 310)
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Contact time	2 discussion classes per week, 4 lectures per week
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Language of tuition	Separate classes for Afrikaans and English
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Department	Industrial and Systems Engineering
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Period of presentation	Semester 2
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Module content

Role of logistics in the economy and organisation. Customer service. Forecasting. Logistics information systems and electronic information flow. Inventory management. Managing materials flow. Distribution channels. Transportation. Warehousing. Packaging. Strategic purchasing. Global logistics. Organising and controlling logistics. Supply chain management. Supply chain finance and performance measurement. SCOR reference models. Implementing logistics strategy.

Business logistics 780 (BLK 780)

Qualification	Postgraduate
Module credits	16.00
Prerequisites	No prerequisites.
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Industrial and Systems Engineering
Period of presentation	Semester 1

Supply chain processes 781 (BLK 781)

Qualification	Postgraduate
Module credits	16.00
Programmes	BEngHons Industrial Engineering BScHons Applied Science Industrial Systems
Prerequisites	No prerequisites.
Contact time	24 contact hours
Language of tuition	Module is presented in English
Department	Industrial and Systems Engineering
Period of presentation	Semester 1 or Semester 2

Module content

A key objective of supply chain management is to develop competitiveness and achieve a market advantage through the implementation of cross-functional processes as the mechanism to coordinate internal and external activities.

The course aims to create an understanding of the importance of integrating key supply chain business processes and to develop the ability to analyse and implement such processes across functional and corporate silos. Standardised process definitions and practices, including strategic and operational sub-processes and key performance measurements, are considered.

Course outline:

- Customer Relationship Management Process
- Supplier Relationship Management Process
- Customer Service Management Process
- Demand Management Process
- Order fulfilment Process
- Manufacturing Flow Management (Planning and Control) Process
- Product Development and Commercialisation Process
- Returns Management Process
- Assessment of Supply Chain Management (SCM) Processes
- Implementing and Sustaining SCM Processes
- Supply Chain Mapping Approaches
- Supply Chain Performance Measurement

Biometry 120 (BME 120)

Qualification	Undergraduate
Module credits	16.00
Programmes	BIT Information Systems BSc Biochemistry BSc Biological Sciences BSc Biotechnology BSc Chemistry BSc Culinary Science BSc Ecology BSc Entomology BSc Environmental Sciences BSc Extended programme - Biological and Agricultural Sciences BSc Extended programme - Physical Sciences BSc Food Science BSc Genetics BSc Geography BSc Human Genetics BSc Human Physiology BSc Human Physiology, Genetics and Psychology BSc Information and Knowledge Systems BSc Medical Sciences BSc Meteorology BSc Microbiology BSc Nutrition BSc Plant Science BSc Zoology BScAgric Animal Science BScAgric Applied Plant and Soil Sciences BScAgric Plant Pathology BVSc
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Natural and Agricultural Sciences Faculty of Veterinary Science
Prerequisites	At least 4 (50-59%) in Mathematics in the Grade 12 examination, or at least 50% in both Statistics 113, 123
Contact time	1 practical per week, 4 lectures per week
Language of tuition	Module is presented in English
Department	Statistics
Period of presentation	Semester 2

Module content

Simple statistical analysis: Data collection and analysis: Samples, tabulation, graphical representation, describing location, spread and skewness. Introductory probability and distribution theory. Sampling distributions and the central limit theorem. Statistical inference: Basic principles, estimation and testing in the one- and two-sample cases (parametric and non-parametric). Introduction to experimental design. One- and twoway designs, randomised blocks. Multiple statistical analysis: Bivariate data sets: Curve fitting (linear and non-linear), growth curves. Statistical inference in the simple regression case. Categorical analysis: Testing goodness of fit and contingency tables. Multiple regression and correlation: Fitting and testing of models. Residual analysis. Computer literacy: Use of computer packages in data analysis and report writing.

Process optimisation 781 (BMK 781)

Qualification	Postgraduate
Module credits	16.00
Prerequisites	No prerequisites.
Contact time	24 contact hours
Language of tuition	Module is presented in English
Department	Industrial and Systems Engineering
Period of presentation	Semester 1 or Semester 2

Module content

Process optimisation is an engineering discipline which focuses on the tools and techniques used specifically for business process analysis, design, and optimisation. As physics determines the physical behaviour of tangibles, process physics forms the foundation of business process behaviour. Traditionally, operations research techniques are used by Industrial Engineers to optimise business processes, process optimisation provides a more focused approach using techniques such as Social Network Analysis, System Dynamics, image profiling and process mining to uncover analytical models.

The outcome of this course is to enable the student to create an integrated, analytical business process behaviour profile. This supports the analysis, design and optimisation of business processes in a Business Engineering lifecycle. The following topics are covered in the course:

- Standard Process Physics principles, facts and models.
- Process Intelligence
- Adaptive process control and SMART processes
- Robustness and complexity analysis
- Process mining
- Social Network Analysis

Process optimisation requires an understanding of operations research within the business engineer framework. This course requires a full understanding of undergraduate Industrial Engineering modules as well as a postgraduate understanding of resource optimisation and enterprise architecture.

Operational management 310 (BOB 310)

Qualification	Undergraduate
Module credits	16.00

Programmes	BEng Industrial Engineering BEng Industrial Engineering ENGAGE
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Prerequisites	No prerequisites.
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Contact time	2 practicals per week, 4 lectures per week
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Language of tuition	Module is presented in English
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Department	Industrial and Systems Engineering
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Period of presentation	Semester 1
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Module content

Introduction to operations management, operations strategy and competitiveness. World-class and agile manufacturing. Operations planning in the service industries. The manufacturing management environment. Batching principles (EOQ and DEL). Manufacturing planning and control systems. Sales and operations planning. Capacity planning and control. Demand management. Master production scheduling. Materials requirements planning (MRP). Distribution requirements planning. Just-in-time (JIT) manufacturing. Synchronous manufacturing (Theory of constraints). Comparing MRP, JIT and TOC. Shop-floor scheduling and control. Integration and implementation of manufacturing planning and control systems. Enterprise Resource Planning (ERP) systems. Business process transformation.

Operational research 410 (BON 410)

Qualification	Undergraduate
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Module credits	16.00
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Programmes	BEng Industrial Engineering BEng Industrial Engineering ENGAGE
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Prerequisites	(BES 220), (BOZ 312)
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Contact time	1 tutorial per week, 3 lectures per week
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Language of tuition	Module is presented in English
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Department	Industrial and Systems Engineering
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Period of presentation	Semester 1
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Module content

Review of basic probability, Markov chain models, Markov decision models. Queuing systems: M/M/1 queues (both finite and infinite capacity), etc.; deterministic and stochastic inventory models. Competitive games: pure and mixed strategies, optimum strategy, two-person zero-sum games, graphical methods and applications, LP methods for games.

Plant biology 161 (BOT 161)

Qualification	Undergraduate
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Module credits	8.00
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Programmes	BEd Senior Phase and Further Education and Training Teaching
	BSc Biochemistry
	BSc Biological Sciences
	BSc Biotechnology
	BSc Chemistry
	BSc Computer Science
	BSc Ecology
	BSc Entomology
	BSc Environmental Sciences
	BSc Extended programme - Biological and Agricultural Sciences
	BSc Food Science
	BSc Genetics
	BSc Human Genetics
	BSc Human Physiology
	BSc Information and Knowledge Systems
	BSc Microbiology
	BSc Physics
	BSc Plant Science
	BSc Zoology
	BScAgric Agricultural Economics and Agribusiness Management
	BScAgric Animal Science
	BScAgric Applied Plant and Soil Sciences
	BScAgric Plant Pathology

Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education
Prerequisites	MLB 111 GS
Contact time	2 lectures per week, fortnightly practicals
Language of tuition	Module is presented in English
Department	Department of Plant and Soil Sciences
Period of presentation	Semester 2

Module content

Basic plant structure and function; introductory plant taxonomy and plant systematics; principles of plant molecular biology and biotechnology; adaptation of plants to stress; medicinal compounds from plants; basic principles of plant ecology and their application in natural resource management.

Building drawings 111 (BOU 111)

Qualification	Undergraduate
Module credits	4.00
Programmes	BSc Construction Management BSc Quantity Surveying BSc Real Estate
Prerequisites	No prerequisites.
Contact time	1 lecture per week, 1 practical per week

Language of tuition	Module is presented in English
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Department	Construction Economics
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Period of presentation	Semester 1
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Module content

Students are introduced to design aspects in the built environment by doing basic technical drawings of simple building structures with appropriate detail sketches.

Building drawings 121 (BOU 121)

Qualification	Undergraduate
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Module credits	6.00
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Prerequisites	No prerequisites.
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Language of tuition	Module is presented in English
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Department	Construction Economics
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Period of presentation	Semester 2
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Module content

Broadens the vocabulary of the technical language from BOU 111. Students are introduced to other aspects of the building industry that include the following topics: topography; symbols; ergonomic design principles; orientation of buildings; perspective drawings; waterproofing and dampcourse applications.

Operational research 312 (BOZ 312)

Qualification	Undergraduate
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Module credits	16.00
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Programmes	BEng Industrial Engineering BEng Industrial Engineering ENGAGE
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Prerequisites	No prerequisites.
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Contact time	2 discussion classes per week, 4 lectures per week
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Language of tuition	Module is presented in English
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Department	Industrial and Systems Engineering
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Period of presentation	Semester 1
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Module content

Introduction to Operations Research, and more specifically the branch of optimisation and its application to industrial problems. In the module the topics of linear and integer linear programming are introduced. The focus is on identifying and scoping appropriate problems, the subsequent formulation of problems, solution algorithms, and post-optimisation sensitivity analysis. Students are exposed to solving problems using optimisation software.

Operations research 780 (BOZ 780)

Qualification	Postgraduate
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Module credits	32.00
Programmes	BEngHons Industrial Engineering BScHons Applied Science Industrial Systems
Prerequisites	BAN 313 or BAN 780
Contact time	36 contact hours per semester
Language of tuition	Module is presented in English
Department	Industrial and Systems Engineering
Period of presentation	Semester 1 or Semester 2

Module content

Building on undergraduate modules in Operations Research, the module aims to extend the mathematical programming and optimisation capabilities by introducing uncertainty. Many decision makers are confronted with complex environments in which data is not known with certainty, or in which the decision constraints are uncertain. For cases where one knows the shape, or can assume that the uncertainty follows a known probabilistic distribution, stochastic programming can be used. In the module both chance-constrained programming and fixed recourse are introduced. Fuzzy optimisation is introduced for cases where the shape and/or distribution of the uncertainty are not known. The module also addresses the uncertainty when a decision maker is confronted with multiple, competing objectives.

Professional ethics 211 (BPE 211)

Qualification	Undergraduate
Module credits	6.00
Programmes	BCom Accounting Sciences
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Economic and Management Sciences
Prerequisites	No prerequisites.
Contact time	1 lecture per week
Language of tuition	Module is presented in English
Department	Philosophy
Period of presentation	Semester 1

Module content

In the first quarter of this module students are equipped with an understanding of the moral issues influencing human agency in economic and political contexts. In particular philosophy equips students with analytical reasoning skills necessary to understand and solve complex moral problems related to economic and political decision making. We demonstrate to students how the biggest questions concerning the socio-economic aspects of our lives can be broken down and illuminated through reasoned debate. Examples of themes which may be covered in the module include justice and the common good, a moral consideration of the nature and role of economic markets on society, issues concerning justice and equality, and dilemmas of loyalty. The works of philosophers covered may for instance include that of Aristotle, Locke, Bentham, Mill, Kant, Rawls, Friedman, Nozick, Bernstein, Dworkin, Sandel, Walzer, and MacIntyre. In the second quarter of the module the focus is on professionalism, careers and ethics. Codes of ethics in business and professions, professional codes, as well as ethical issues in the accountancy profession are discussed.

Project 410 (BPJ 410)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Industrial Engineering BEng Industrial Engineering ENGAGE
Prerequisites	Finalists only
Contact time	1 other contact session per week
Language of tuition	Module is presented in English
Department	Industrial and Systems Engineering
Period of presentation	Semester 1

Module content

Choice of project topic. Appointment of project leader. Literature study, analysis and creation of alternatives.

Project 420 (BPJ 420)

Qualification	Undergraduate
Module credits	24.00
Programmes	BEng Industrial Engineering BEng Industrial Engineering ENGAGE
Prerequisites	BPJ 410
Contact time	1 other contact session per week
Language of tuition	Module is presented in English
Department	Industrial and Systems Engineering
Period of presentation	Semester 2

Module content

Narrowing of topic choice. Detailed solution of chosen alternative. Writing of final project report and presentation of project.

Practical training 310 (BPY 310)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Industrial Engineering BEng Industrial Engineering ENGAGE
Prerequisites	No prerequisites.
Contact time	1 other contact session per week
Language of tuition	Separate classes for Afrikaans and English
Department	Industrial and Systems Engineering
Period of presentation	Semester 1 or Semester 2

Module content

*Attendance module only

During or at the end of the second year of study, students in industrial engineering undergo at least six weeks of prescribed practical training in the industry. A satisfactory report on the practical training must be submitted to the Faculty Administration within one week of registration. In exceptional circumstances the prescribed minimum period can be reduced, as approved by the chairman of the School of Engineering.

Practical training 410 (BPY 410)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Industrial Engineering BEng Industrial Engineering ENGAGE
Prerequisites	No prerequisites.
Contact time	1 other contact session per week
Language of tuition	Separate classes for Afrikaans and English
Department	Industrial and Systems Engineering
Period of presentation	Semester 1

Module content

*Attendance module only

During or at the end of the third year of study, students in industrial engineering undergo at least six weeks of prescribed practical training in the industry. A satisfactory report on the practical training must be submitted to the department within one week of registration. In exceptional circumstances the prescribed minimum period can be reduced, as approved by the chairman of the School of Engineering.

Productivity 220 (BPZ 220)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Industrial Engineering BEng Industrial Engineering ENGAGE
Prerequisites	No prerequisites.
Contact time	2 discussion classes per week, 4 lectures per week
Language of tuition	Module is presented in English
Department	Industrial and Systems Engineering
Period of presentation	Semester 2

Module content

Qualifying and quantifying productivity: efficiency, effectiveness, utilisation, profitability and competitiveness. Method study: critical examination and process flow charts and diagrams. Work measurement: time study and activity sampling. Organisational behaviour: motivation, incentive schemes, group forming, work teams, job design and change management. Ergonomics.

Business engineering 321 (BPZ 321)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Industrial Engineering BEng Industrial Engineering ENGAGE
Contact time	2 tutorials per week, 4 lectures per week
Language of tuition	Module is presented in English
Department	Industrial and Systems Engineering
Period of presentation	Semester 2

Module content

Strategic analysis; strategy formulation; blue-ocean strategy; grand strategy matrix; SWOT/ TOWS analysis; strategy canvas; customer segmentation; marketing mix; value chain; business model canvas; business model analysis; combination of business models to create new ideas; change management; entrepreneurship; creating a business plan; integration of theory with real world application.

Business engineering 421 (BPZ 421)

Qualification	Undergraduate
Module credits	16.00
Prerequisites	No prerequisites.
Contact time	2 tutorials per week, 4 lectures per week
Language of tuition	Module is presented in English

Department	Industrial and Systems Engineering
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Period of presentation	Semester 2
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Module content

Integration of engineering functions; strategic planning; organisational structures; business management; systems engineering; work-flow management; process modelling; business architecture; change management and motivation; marketing management and industry exposure. Business management game project.

Production management 781 (BPZ 781)

Qualification	Postgraduate
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Module credits	16.00
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Prerequisites	No prerequisites.
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Contact time	24 contact hours per semester
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Language of tuition	Module is presented in English
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Department	Industrial and Systems Engineering
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Period of presentation	Semester 2
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Manufacturing planning systems 782 (BPZ 782)

Qualification	Postgraduate
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Module credits	32.00
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Programmes	BEngHons Industrial Engineering BScHons Applied Science Industrial Systems
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Prerequisites	Operations Management and Operations Research (advisable but not mandatorily required)
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Contact time	36 contact hours per semester
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Language of tuition	Module is presented in English
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Department	Industrial and Systems Engineering
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Period of presentation	Semester 1 or Semester 2
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Module content

Review of MPC, Agile Manufacturing Processes, Models of MPC

Section 1: Review of MPC Theories and Framework

Section 2: Research Framework for Problems in Manufacturing Systems

1. Mathematical Model based Problems and their techniques
2. Estimation and Hypothesis based Problems and their techniques

Section 3: Introduction to MPC Problems and sample Models

1. Forecasting models
2. Aggregate planning models
3. Lot sizing and disaggregation models
4. Finite Scheduling models
5. Lean Manufacturing Models
6. Basic Distribution and Replenishment Models
7. Basic Supply Chain Structural Analysis and Performance Models

Section 4: Agile Panning Problems and Techniques

1. Multi-Level Master Scheduling Techniques
2. Constraint Scheduling – (TOC theory, applications and optimisation)
3. Lean Manufacturing Implementation (from Flow Lean to Process Kaizen)
4. Introduction to CONWIP ideology
5. Introduction to Demand Driven MRP

Quantity surveying practice 300 (BRK 300)

Qualification	Undergraduate
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Module credits	18.00
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Programmes	BSc Quantity Surveying
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Prerequisites	HVH 200
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Contact time	3 lectures per week
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Language of tuition	Afrikaans and English are used in one class
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Department	Construction Economics
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Period of presentation	Year
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Module content

Management theory; basic principles of production management, lists of materials; pricing; payment certificates; final accounts; contract price adjustments; application of computer-based measuring programmes.

Quantity surveying practice 700 (BRK 700)

Qualification	Postgraduate
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Module credits	12.00
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Programmes	BScHons Quantity Surveying
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Prerequisites	No prerequisites.
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Contact time	2 lectures per week
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Language of tuition	Module is presented in English
Department	Construction Economics
Period of presentation	Year

Module content

Construction Procurement Guidelines; standards for uniformity; contract administration; project administration; conditions of appointment and fee accounts; consortiums; tendering for professional services; professional indemnity; Public Private Partnerships; Quantity Surveying Professions Act; Council for the Built Environment Act; CIDB Act.

Construction Industry Development Board Act (CIDB Act), Public Finance Management Act (PFMA), Municipal Finance Management Act (MFMA) and Preferential Procurement Policy Framework Act (PPFA).

Research report 785 (BRK 785)

Qualification	Postgraduate
Module credits	30.00
Programmes	BScHons Quantity Surveying
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Construction Economics
Period of presentation	Year

Module content

An essay on a subject approved by the Head of Department should be handed in during the final year of study.

Dissertation: Quantity surveying 890 (BRK 890)

Qualification	Postgraduate
Module credits	180.00
Programmes	MSc Quantity Surveying
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Construction Economics
Period of presentation	Year

Mini-dissertation: Quantity surveying 895 (BRK 895)

Qualification	Postgraduate
Module credits	180.00
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Construction Economics

Period of presentation	Year
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Thesis: Quantity surveying 990 (BRK 990)

Qualification	Postgraduate
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Module credits	360.00
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Programmes	PhD Quantity Surveying
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Prerequisites	No prerequisites.
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Language of tuition	Module is presented in English
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Department	Construction Economics
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Period of presentation	Year
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Mini-dissertation: Industrial engineering 895 (BSC 895)

Qualification	Postgraduate
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Module credits	16.00
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Prerequisites	No prerequisites.
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Language of tuition	Module is presented in English
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Department	Industrial and Systems Engineering
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Period of presentation	Year
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Business engineering 780 (BSI 780)

Qualification	Postgraduate
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Module credits	16.00
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Prerequisites	No prerequisites.
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Contact time	24 contact hours
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Language of tuition	Module is presented in English
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Department	Industrial and Systems Engineering
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Period of presentation	Semester 1 or Semester 2
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Module content

Organisations are complex systems which consist of people, processes, customers, resources and regulatory environments. Business Engineering (BE) is a discipline which uses an engineering approach towards introducing planned business change into the organisation. This includes formal analysis, design, implementation and maintenance of the holistic business system; requiring a deep understanding and knowledge of the interaction and balance of complex business system elements.

The outcome of the course is to enable the student to understand the art and science of engineering complex business systems. The following topics are covered in the course:

- BE principles for design, implementation and optimisation of complex business systems
- BE programme process which governs the implementation of holistic business changes
- BE programme and project structures
- BE Tools and techniques used throughout the BE lifecycle for engineering modelling and optimisation.
- Business
- Models and innovation approaches
- Integrated Business planning
- Business Process reference models for strategic, tactical, core and support processes.

Business engineering is the ultimate pinnacle of industrial engineering competency – being able to construct business systems serving complicated organisational value propositions. The course requires a full understanding of undergraduate Industrial Engineering modules as well as a postgraduate understanding of resource optimisation, enterprise architecture, and supply chain engineering.

Management accounting 410 (BSR 410)

Qualification	Undergraduate
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Module credits	16.00
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Programmes	BEng Industrial Engineering BEng Industrial Engineering ENGAGE
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Service modules	Faculty of Engineering, Built Environment and Information Technology
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Prerequisites	FBS 110
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Contact time	6 lectures per week
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Language of tuition	Module is presented in English
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Department	Financial Management
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Period of presentation	Semester 1
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Module content

The work of management and the need for managerial accounting information. The changing business environment. Cost terms, concepts, and classification. Job order costing. Process costing. Activity-based costing and quality management. Cost-volume-profit relations. Variable and fixed costing. Budgeting and control. Standard costs and flexible budgets. Segment reporting and decentralisation. Relevant costs for decision-making. Allocations of service departments cost to operating departments.

Engineering management 310 (BSS 310)

Qualification	Undergraduate
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Module credits	8.00
Programmes	BEng Chemical Engineering BEng Chemical Engineering ENGAGE BEng Computer Engineering BEng Computer Engineering ENGAGE BEng Electrical Engineering BEng Electrical Engineering ENGAGE BEng Electronic Engineering BEng Electronic Engineering ENGAGE BEng Industrial Engineering BEng Industrial Engineering ENGAGE BEng Mechanical Engineering BEng Mechanical Engineering ENGAGE BEng Metallurgical Engineering BEng Metallurgical Engineering ENGAGE BEng Mining Engineering BEng Mining Engineering ENGAGE
Prerequisites	No prerequisites.
Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	Industrial and Systems Engineering
Period of presentation	Semester 1

Module content

The purpose of this module is to develop knowledge and understanding of engineering management principles and economic decision-making so that students can design, manage, evaluate and participate in engineering projects in the workplace. As such elements from engineering economics, project management and systems engineering are combined.

This module develops and assesses the students' competence in terms of ECSA Exit Level Outcome 11 relating to Engineering Management.

Systems engineering 410 (BSS 410)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Industrial Engineering BEng Industrial Engineering ENGAGE
Prerequisites	No prerequisites.
Contact time	1 discussion class per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Industrial and Systems Engineering
Period of presentation	Semester 2

Module content

A company's ability to remain competitive hinges increasingly on its ability to develop successful products. In practice this is often determined by how well the company performs systems engineering. Applying the principles of systems engineering allows designers to understand the big picture, i.e. how a product needs to perform technically as well as within its application domain, e.g. environmentally, human interfaces, and so on. This module equips the student with the relevant tools and process understanding to successfully apply systems engineering to product development. Some of these tools and processes include specification practices, requirements engineering, systems engineering management and verification and validation processes.

Systems engineering 780 (BSS 780)

Qualification	Postgraduate
Module credits	32.00
Prerequisites	No prerequisites.
Contact time	36 contact hours per semester
Language of tuition	Module is presented in English
Department	Industrial and Systems Engineering
Period of presentation	Semester 1 or Semester 2

Module content

Systems engineering is a multidisciplinary engineering profession that focuses on the conception, design and development, integration, architecture and management of complex systems over their life cycle. It does this by creating, executing and coordinating an interactive platform for all stakeholders viz: clients, consumers, design team/technical crew and management team amongst others. Complexity of systems hinges on diversity, multiplicity and intricacy of intra and interconnectivity of system entities. This module will commence briefly with some introductory knowledge prior to diverting to intermediate and advanced concepts with specific attention given to case studies, development and application of models and emergence of research opportunities.

Case-based systems engineering management:

- Concept design: identifying requirements; exploring concepts; evaluating concepts; defining concepts.
- Engineering design: deployment of CORE9 for systems architecting and integrating.
- Post-development considerations: production systems design; operations and logistics in a systems life cycle.

Systems engineering analysis:

- Modelling of case study dynamical systems
- Risk modelling throughout a system's life cycle
- Adaptive and predictive behaviour of systems
- Optimal network selection and complexity issues in system dynamics.

Complexity of interaction in systems:

- Internet of things (IoT)
- Relationship of things (RoT)
- Interaction dynamics
- Social engineering
- System's performance-failure dynamics
- Human-machine systems interaction and AI systems.

Plant genetics and crop biotechnology 361 (BTC 361)

Qualification	Undergraduate
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Module credits	18.00
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Programmes	BSc Biochemistry BSc Biotechnology BSc Genetics BSc Human Genetics BSc Human Physiology BSc Information and Knowledge Systems BSc Microbiology BSc Plant Science BSc Zoology BScAgric Plant Pathology
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Service modules	Faculty of Engineering, Built Environment and Information Technology
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Prerequisites	GTS 251 and {GTS 261 GS or BOT 261}
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Contact time	1 practical/tutorial per week, 2 lectures per week
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Language of tuition	Module is presented in English
Department	Biochemistry, Genetics and Microbiology
Period of presentation	Semester 2

Module content

Plant genetics and genomics: gene control in plants, epigenetics, co-suppression, forward and reverse genetics, structural and functional genomics. Plant development: flowering, genetics imprinting. Plant-environment interactions. Crop genetic modification: food security, GMO regulation, plant transformation, whole-chromosome transformation, synthetic biology, homologous recombination. Crop molecular markers: marker types, genotyping, QTL mapping, marker-assisted breeding. Future of crop biotechnology: applications of genomics, biopharming, genetical genomics, systems biology

Reliability engineering 780 (BTH 780)

Qualification	Postgraduate
Module credits	16.00
Programmes	BEngHons Industrial Engineering BScHons Applied Science Industrial Systems
Prerequisites	No prerequisites.
Contact time	24 contact hours
Language of tuition	Module is presented in English
Department	Industrial and Systems Engineering
Period of presentation	Semester 1 or Semester 2

Module content

To make students conversant with the concepts, tools and techniques of reliability engineering.

Capita selecta from:

- Introduction to Reliability Engineering
- Reliability Mathematics
- Probability Plotting
- Reliability Prediction for Design
- Reliability Testing
- Reliability Growth
- Maintainability
- Reliability Management

Management practice 700 (BTP 700)

Qualification	Postgraduate
Module credits	6.00
Programmes	BScHons Real Estate Retail Property
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English

Department	Construction Economics
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Period of presentation	Semester 2
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Module content

A study of effective business management with reference to various organisational functions. Attention is paid to the built environment practitioner within this context.

Simulation modelling 321 (BUY 321)

Qualification	Undergraduate
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Module credits	16.00
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Programmes	BEng Industrial Engineering BEng Industrial Engineering ENGAGE
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Prerequisites	(BAN 313)
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Contact time	6 lectures per week
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Language of tuition	Module is presented in English
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Department	Industrial and Systems Engineering
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Period of presentation	Semester 2
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Module content

Introduction to simulation as technique. Simulation methodology. Formulation of problem situations by means of simulation models with the emphasis on discrete models. Input and output analysis. Introduction to simulation software.

Simulation modelling 780 (BUY 780)

Qualification	Postgraduate
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Module credits	32.00
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Programmes	BEngHons Industrial Engineering BScHons Applied Science Industrial Systems
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Prerequisites	BAN 313 or BAN 780
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Contact time	36 contact hours per semester
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Language of tuition	Module is presented in English
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Department	Industrial and Systems Engineering
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Period of presentation	Semester 1 or Semester 2
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Module content

In recent years the boundaries between different simulation paradigms such as discrete event simulation, system dynamics and agent-based models have become less distinct. Improvements in computational efficiency also allow much richer and complex models to be built. This course introduces agent-based models (ABM) as a class of computational models that deal with autonomous agents and their interactions with other agents, and their surrounding environments. Course content covers basic theoretical foundations of ABM and then focuses on a few specific application areas where ABM is used for decision-making: pedestrian and transport models; production and logistics; as well as biology.

Supply chain design 780 (BVK 780)

Qualification	Postgraduate
Module credits	16.00
Programmes	BEngHons Industrial Engineering BScHons Applied Science Industrial Systems
Prerequisites	No prerequisites.
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Industrial and Systems Engineering
Period of presentation	Semester 2

Module content

Strategic design of supply chain networks, inventory management and supply chain integration. Framework for strategic alliances and third party logistics. Analysis and application of alternative supply chain reference models as the basis for modelling, analysis and improvement.

Course outline:

- Supply Chain Network Design
- Strategic Management of Inventory
- Supply Chain Integration
- Strategic Alliances
- Coordinated Product and Supply Chain Design
- Supply Chain Modelling (SCOR, VRM)

Building science 110 (BWT 110)

Qualification	Undergraduate
Module credits	8.00
Programmes	BSc Construction Management BSc Quantity Surveying BSc Real Estate
Prerequisites	No prerequisites.
Contact time	3 lectures per week
Language of tuition	Module is presented in English

Department	Construction Economics
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Period of presentation	Semester 1
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Module content

Principles, methods and materials used in best practice in the construction of single-storey buildings up to wall plate height.

Building science 120 (BWT 120)

Qualification	Undergraduate
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Module credits	8.00
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Programmes	BSc Construction Management BSc Quantity Surveying BSc Real Estate
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Prerequisites	BWT 110
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Contact time	3 lectures per week
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Language of tuition	Module is presented in English
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Department	Construction Economics
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Period of presentation	Semester 2
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Module content

Principles, methods and materials used in best practice in the construction of single-storey buildings from wall plate height to completion including finishes and external work. Introduction to alternative practices and materials for sustainability.

Building science 210 (BWT 210)

Qualification	Undergraduate
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Module credits	12.00
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Programmes	BSc Construction Management BSc Quantity Surveying BSc Real Estate
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Prerequisites	BWT 110 and BWT 120
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Contact time	3 lectures per week
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Language of tuition	Module is presented in English
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Department	Construction Economics
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Period of presentation	Semester 1
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Module content

Advanced application of construction technology for the erection of multi-storey, steel reinforced concrete structures as well as steel portal frame construction. Bulk excavations for the creation of deep basements including lateral support through piling systems and other retaining wall structures to prevent embankment failure. Introduction to construction management principles and the effect thereof on the construction process in terms of time, cost and quality. Management of temporary site works, applying formwork design principles, building equipment and earth moving machinery required in advanced construction technology.

Building science 220 (BWT 220)

Qualification Undergraduate

Module credits 8.00

Programmes [BSc Construction Management](#)
[BSc Quantity Surveying](#)
[BSc Real Estate](#)

Prerequisites No prerequisites.

Contact time 3 lectures per week

Language of tuition Module is presented in English

Department Construction Economics

Period of presentation Semester 2

Module content

Material study of metals and materials. Study and development of sensitivity for and the philosophy of industrial safety, accident prevention and total loss control safety risk management in the construction industry.

Building science 310 (BWT 310)

Qualification Undergraduate

Module credits 10.00

Programmes [BSc Construction Management](#)
[BSc Quantity Surveying](#)
[BSc Real Estate](#)

Prerequisites No prerequisites.

Contact time 3 lectures per week

Language of tuition Afrikaans and English are used in one class

Department Construction Economics

Period of presentation Semester 1

Module content

Erection and construction of specialised building components and finishes. Acoustics. Material study of plastics, glues, rubber, mastics, bonding agents, fibre cement, bituminous products, sealers, epoxies and waterproofing.

Building science 320 (BWT 320)

Qualification	Undergraduate
Module credits	8.00
Programmes	BSc Construction Management BSc Quantity Surveying BSc Real Estate
Prerequisites	No prerequisites.
Contact time	3 lectures per week
Language of tuition	Afrikaans and English are used in one class
Department	Construction Economics
Period of presentation	Semester 2

Module content

Thermal properties of insulation systems and construction materials. Review of current development and construction practice; alternative construction technologies; innovation in construction; technical evaluation of innovative construction materials and methods; life cycle costing and life cycle analysis; the National Building Regulations.

Air quality control 780 (CAM 780)

Qualification	Postgraduate
Module credits	32.00
Programmes	BEngHons Environmental Engineering
Prerequisites	No prerequisites.
Contact time	32 contact hours per semester
Language of tuition	Module is presented in English
Department	Chemical Engineering
Period of presentation	Semester 1 or Semester 2

Module content

Air quality awareness and impacts of air pollutants. South African air pollution legislation. Meteorology and dispersion modelling. Measurement of air pollution – sampling and analysis. Equipment design of settling chambers and cyclones. Venturis and other wet cleaning equipment. Bag filters. Electrostatic precipitators. Incinerators, adsorption and absorption equipment.

Air quality control 787 (CAM 787)

Qualification	Postgraduate
Module credits	32.00
Programmes	BScHons Applied Science Environmental Technology
Prerequisites	No prerequisites.

Contact time	32 contact hours per semester
Language of tuition	Module is presented in English
Department	Chemical Engineering
Period of presentation	Semester 1 or Semester 2

Module content

Air quality awareness and impacts of air pollutants. South African air pollution legislation. Meteorology and dispersion modelling. Measurement of air pollution – sampling and analysis. Equipment design of settling chambers and cyclones. Venturis and other wet cleaning equipment. Bag filters. Electrostatic precipitators. Incinerators, adsorption and absorption equipment.

Dissertation: Control 890 (CBC 890)

Qualification	Postgraduate
Module credits	180.00
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Chemical Engineering
Period of presentation	Year

Dissertation: Control engineering 890 (CBH 890)

Qualification	Postgraduate
Module credits	180.00
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Chemical Engineering
Period of presentation	Year

Biochemical engineering 310 (CBI 310)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Chemical Engineering BEng Chemical Engineering ENGAGE
Prerequisites	(CIR 211), (CHM 215) ,(WTW 256), MPR 213
Contact time	3 practicals per week, 4 lectures per week
Language of tuition	Module is presented in English
Department	Chemical Engineering
Period of presentation	Semester 1

Module content

Characterisation and taxonomy of biological material. Biochemistry and the chemistry of life. Biological growth requirements, metabolism, growth kinetics and product formation. Enzyme chemistry and kinetics, basic stoichiometry of biological reactions as well as mass - and energy balances for these processes using a chemical engineering approach. Biological reactor, operation and downstream processing.

Multivariable control system design 700 (CBO 700)

Qualification	Postgraduate
Module credits	32.00
Programmes	BEngHons Control Engineering
Prerequisites	No prerequisites.
Contact time	40 contact hours per semester
Language of tuition	Module is presented in English
Department	Chemical Engineering
Period of presentation	Semester 2

Bioprocessing 732 (CBP 732)

Qualification	Postgraduate
Module credits	32.00
Programmes	BEngHons Chemical Engineering BScHons Applied Science Chemical Technology
Prerequisites	No prerequisites.
Contact time	32 contact hours per semester
Language of tuition	Module is presented in English
Department	Chemical Engineering
Period of presentation	Semester 1

Module content

Description of industrial biotechnology in a process engineering environment. Focus on specific applications in the mining, agricultural, paper and pulp, medical, pharmaceutical, veterinary, brewing and food industries. Principles including implications of bio-prospecting, bio-safety, inoculum production, aseptic growth, quality control and product formulation as applicable to bio-processes. Fermentation with various microbial groups, bio-leaching, gene transfer, solid-substrate fermentation, enzymatic catalysis and immunology. Bioreactors, batch and continuous processing. Bio-remediation.

Multivariable control system theory 700 (CBT 700)

Qualification	Postgraduate
Module credits	32.00
Programmes	BEngHons Control Engineering

Prerequisites	No prerequisites.
Contact time	48 contact hours per semester
Language of tuition	Module is presented in English
Department	Chemical Engineering
Period of presentation	Semester 1

Thesis: Chemical technology 990 (CCT 990)

Qualification	Postgraduate
Module credits	360.00
Programmes	PhD Chemical Technology
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Chemical Engineering
Period of presentation	Year

Principles of environmental engineering 780 (CEM 780)

Qualification	Postgraduate
Module credits	32.00
Programmes	BEngHons Environmental Engineering BEngHons Water Utilisation Engineering
Prerequisites	No prerequisites.
Contact time	32 contact hours per semester
Language of tuition	Module is presented in English
Department	Chemical Engineering
Period of presentation	Semester 1

Module content

Engineering principles for environmental preservation and management, pollution control, life-cycle assessment, interactions in the macro and micro-environments, global and ecological systems, social-economic factors in environmental systems, predictive models for the current and future environment, environmental engineering as the driver of economic systems.

Principles of environmental engineering 787 (CEM 787)

Qualification	Postgraduate
Module credits	32.00
Programmes	BScHons Applied Science Environmental Technology
Prerequisites	No prerequisites.

Contact time	32 contact hours per semester
Language of tuition	Module is presented in English
Department	Chemical Engineering
Period of presentation	Semester 1 or Semester 2

Module content

Engineering principles for environmental preservation and management, pollution control, life-cycle assessment, interactions in the macro and micro-environments, global and ecological systems, social-economic factors in environmental systems, predictive models for the current and future environment, environmental engineering as the driver of economic systems.

Thesis: Environmental technology 990 (CET 990)

Qualification	Postgraduate
Module credits	360.00
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Chemical Engineering
Period of presentation	Year

Fluoro-materials science research and technology 732 (CFT 732)

Qualification	Postgraduate
Module credits	32.00
Programmes	BEngHons Chemical Engineering BScHons Applied Science Chemical Technology
Prerequisites	No prerequisites.
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Chemical Engineering
Period of presentation	Semester 2

General chemistry 171 (CHM 171)

Qualification	Undergraduate
Module credits	16.00

Programmes	BEng Chemical Engineering
	BEng Chemical Engineering ENGAGE
	BEng Civil Engineering
	BEng Civil Engineering ENGAGE
	BEng Electrical Engineering
	BEng Electrical Engineering ENGAGE
	BEng Electronic Engineering
	BEng Electronic Engineering ENGAGE
	BEng Metallurgical Engineering
	BEng Metallurgical Engineering ENGAGE
	BEng Mining Engineering
	BEng Mining Engineering ENGAGE

Service modules	Faculty of Engineering, Built Environment and Information Technology
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Prerequisites	No prerequisites.
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Contact time	1 discussion class per week, 1 practical per week, 1 web-based period per week, 4 lectures per week
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Language of tuition	Module is presented in English
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Department	Chemistry
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Period of presentation	Semester 1
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Module content

General introduction to inorganic, analytical and physical chemistry. Nomenclature of inorganic ions and compounds, stoichiometric calculations concerning chemical reactions, redox reactions, solubilities and solutions, atomic structure, periodicity. Molecular structure and chemical bonding using the VSEPR model. Principles of reactivity, electrochemistry, energy and chemical reactions, entropy and free energy. Appropriate tutorial classes and practicals.

General chemistry 172 (CHM 172)

Qualification	Undergraduate
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Module credits	16.00
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Programmes	BEng Industrial Engineering
	BEng Industrial Engineering ENGAGE
	BEng Mechanical Engineering
	BEng Mechanical Engineering ENGAGE

Service modules	Faculty of Engineering, Built Environment and Information Technology
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Prerequisites	No prerequisites.
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Contact time	1 discussion class per week, 1 practical per week, 1 web-based period per week, 4 lectures per week
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Language of tuition	Module is presented in English
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Department	Chemistry
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Period of presentation	Semester 2
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Module content

General introduction to inorganic, analytical and physical chemistry. Nomenclature of inorganic ions and compounds, stoichiometric calculations concerning chemical reactions, redox reactions, solubilities and solutions, atomic structure, periodicity. Molecular structure and chemical bonding using the VSEPR model. Principles of reactivity, electrochemistry, energy and chemical reactions, entropy and free energy. Appropriate tutorial classes and practicals.

General chemistry 181 (CHM 181)

Qualification Undergraduate

Module credits 16.00

Programmes [BEng Chemical Engineering](#)
[BEng Chemical Engineering ENGAGE](#)

Service modules Faculty of Engineering, Built Environment and Information Technology

Prerequisites CHM 171

Contact time 1 discussion class per week, 1 practical per week, 1 web-based period per week, 4 lectures per week

Language of tuition Module is presented in English

Department Chemistry

Period of presentation Semester 2

Module content

One quarter general physical-analytical chemistry: Physical behaviour of gases, intermolecular forces, solutions, liquids and solids (phase changes), chemical equilibrium, acids and bases, applications of aqueous equilibria (e.g. buffers, titrations, solubility) precipitation. One quarter organic chemistry: Structure and bonding, functional groups and drawing of structures of organic compounds, nomenclature, isomerism, introductory stereochemistry, introduction to chemical reactions and chemical properties of organic compounds. Appropriate tutorial classes and practicals. Quality theoretical and practical teaching with an ethical approach provides a broad understanding of fundamental chemistry, e.g. predicting the behaviour of specific functional groups present in organic compounds, essential for new drug development, purification of mixtures and proper waste management to protect the environment and ultimately human and animal life, thereby meeting some of the UN sustainable development goals.

Chemistry 215 (CHM 215)

Qualification Undergraduate

Module credits 12.00

Programmes [BEng Chemical Engineering](#)
[BEng Chemical Engineering ENGAGE](#)

Service modules Faculty of Engineering, Built Environment and Information Technology

Prerequisites CHM 171 or CHM 172 and CHM 181

Contact time 1 practical per week, 3 lectures per week

Language of tuition	Module is presented in English
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Department	Chemistry
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Period of presentation	Semester 1
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Module content

Organic chemistry. Chemical properties of organic (including aromatic) compounds. Functional group transformation and synthesis.

Chemistry 226 (CHM 226)

Qualification	Undergraduate
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Module credits	8.00
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Programmes	BEng Chemical Engineering BEng Chemical Engineering ENGAGE
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Service modules	Faculty of Engineering, Built Environment and Information Technology
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Prerequisites	CHM 171 or CHM 172 and CHM 181
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Contact time	2 lectures per week, 6 ppw
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Language of tuition	Module is presented in English
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Department	Chemistry
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Period of presentation	Semester 2
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Module content

Theory: Introduction to instrumental chemical analysis. Integration of electronic, chemical, optical and computer principles for the construction of analytical instrumentation. Detail discussion of principles and some instrumental methods from three disciplines within analytical chemistry, namely electrochemistry, spectroscopy and chromatography. This includes potentiometry, (AA) atomic absorption-, (ICP) atomic emission-, ultraviolet (UV)-, and infrared (IR) spectroscopy, potentiometric and photometric titrations, gas chromatography, liquid chromatography as well as combinations of these techniques. Practical: IR spectroscopy, UV spectroscopy, AA spectroscopy, potentiometric titration, gas chromatography.

Chemical engineering materials 210 (CIM 210)

Qualification	Undergraduate
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Module credits	8.00
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Programmes	BEng Chemical Engineering BEng Chemical Engineering ENGAGE
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Prerequisites	CHM 181
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Contact time	2 lectures per week, 2 tutorials per week
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Language of tuition	Module is presented in English
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Department	Chemical Engineering
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Period of presentation	Semester 1
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Module content

Introduction to the synthesis, processing, structure, physical properties, and technical performance of important engineering materials: metals, ceramics, polymers and composites. Structural, mechanical, thermodynamic, and design related issues important to chemical engineering applications. Materials specification with emphasis on the corrosion of metals and life time estimation for polymer components.

Chemical engineering design 320 (CIO 320)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Chemical Engineering BEng Chemical Engineering ENGAGE
Prerequisites	(CTD 223), SWK 210, COP 311 GS
Contact time	3 tutorials per week, 4 lectures per week
Language of tuition	Module is presented in English
Department	Chemical Engineering
Period of presentation	Semester 2

Module content

Steady and unsteady state conductive heat transfer in one to three dimensions. Temperature distributions. Convective heat transfer. Application of boundary layer theory. Determination of film coefficients. Design of heat transfer equipment. Radiant heat transfer. Application of the mechanical energy balance to single phase Newtonian fluids in steady state systems. Adjustment for multiphase, non-Newtonian as well as pulsating systems. Orifice design. Optimal economic choice of pipe diameters, pumps and control valves.

Process integration 732 (CIP 732)

Qualification	Postgraduate
Module credits	32.00
Prerequisites	No prerequisites.
Contact time	44 contact hours per semester
Language of tuition	Module is presented in English
Department	Chemical Engineering
Period of presentation	Semester 2

Chemical engineering 113 (CIR 113)

Qualification	Undergraduate
Module credits	8.00
Programmes	BEng Chemical Engineering BEng Chemical Engineering ENGAGE
Prerequisites	No prerequisites.

Contact time	2 lectures per week, 2 tutorials per week
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Language of tuition	Module is presented in English
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Department	Chemical Engineering
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Period of presentation	Semester 1
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Module content

Dimensions, units and their conversion. The mol unit, density, concentration. Specific volume, bulk density, density of ideal mixtures. Temperatures and conversions. Pressure, absolute and gauge. Expression of concentration. Empirical formulae. Introduction to material balances: strategy for solving problems. Material balances without chemical reaction. Combinations of equipment.

Chemical engineering 123 (CIR 123)

Qualification	Undergraduate
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Module credits	8.00
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Programmes	BEng Chemical Engineering BEng Chemical Engineering ENGAGE
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Prerequisites	CIR 113 GS, CHM 171 GS
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Contact time	2 lectures per week, 2 tutorials per week
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Language of tuition	Module is presented in English
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Department	Chemical Engineering
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Period of presentation	Semester 2
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Module content

Chemical reaction and stoichiometry, excess reactant, conversion, yield, selectivity. Material balances with recycle streams, bypass streams and purge streams. Gases, vapours and liquids: ideal gas law, SG and density of gases, Nm³. Material balances where gases are involved. Fuels and combustion: coal analysis, combustion calculations.

Chemical engineering 211 (CIR 211)

Qualification	Undergraduate
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Module credits	12.00
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Programmes	BEng Chemical Engineering BEng Chemical Engineering ENGAGE
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Prerequisites	CIR 123
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Contact time	3 lectures per week, 3 tutorials per week
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Language of tuition	Module is presented in English
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Department	Chemical Engineering
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Period of presentation	Semester 1
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Module content

Vapour pressure, phase changes, equilibrium. Vapour/gas equilibrium; Henry's law. Enthalpy and enthalpy balances. Heat of reaction. Data and data sources, steam tables. Enthalpy and combustion; flame temperature. Heats of solution and mixing. Miscible and immiscible liquid mixtures; dew point, bubble point. Simultaneous mass and enthalpy balances. PVT properties of real gases, PVT-diagrams of pure compounds. Vapour liquid equilibrium for ideal mixtures (Raoult's law).

Chemical engineering 310 (CIR 310)

Qualification	Undergraduate
Module credits	8.00
Programmes	BEng Chemical Engineering BEng Chemical Engineering ENGAGE
Prerequisites	(CTD 223), CHM 215
Contact time	2 lectures per week, 2 tutorials per week
Language of tuition	Module is presented in English
Department	Chemical Engineering
Period of presentation	Semester 1

Module content

Fundamentals of phase and chemical equilibrium with emphasis on vapour/liquid systems leading to the study of separations and reacting systems. Concepts and formalism of thermodynamics. Postulates and laws of thermodynamics. Thermodynamic functions (enthalpy, entropy, Gibbs free energy). Thermochemistry and Ellingham diagrams. Phase Equilibria: Phase diagrams of single substances, phase boundaries, the Phase Rule. Phase diagrams of mixtures, steam distillation, eutectic mixtures. Solution thermodynamics: Ideal and non-ideal solutions, excess properties and activity coefficient models. The equations of state of ideal and real gases, residual properties and fugacity. Vapour-liquid equilibrium from equations of state and the approach. Application of thermodynamics to equilibrium between fluid- (gas and liquid) and condensed (liquid and solid) phases. Chemical reaction equilibrium.

Chemical engineering 702 (CIR 702)

Qualification	Postgraduate
Module credits	32.00
Programmes	BEngHons Chemical Engineering
Prerequisites	Registration requires departmental approval.
Contact time	8 contact hours per semester
Language of tuition	Module is presented in English
Department	Chemical Engineering
Period of presentation	Year

Chemical engineering 707 (CIR 707)

Qualification	Postgraduate
Module credits	32.00
Programmes	BScHons Applied Science Chemical Technology
Prerequisites	Registration requires departmental approval.
Contact time	8 contact hours per semester
Language of tuition	Module is presented in English
Department	Chemical Engineering
Period of presentation	Year

Chemical engineering 787 (CIR 787)

Qualification	Postgraduate
Module credits	16.00
Programmes	BScHons Applied Science Chemical Technology
Prerequisites	Registration requires departmental approval.
Contact time	10 lectures per week
Language of tuition	Module is presented in English
Department	Chemical Engineering
Period of presentation	Semester 1 or Semester 2

Chemical engineering 807 (CIR 807)

Qualification	Postgraduate
Module credits	32.00
Prerequisites	No prerequisites.
Contact time	32 contact hours per semester
Language of tuition	Module is presented in English
Department	Chemical Engineering
Period of presentation	Year

Dissertation: Chemical engineering 890 (CIR 890)

Qualification	Postgraduate
Module credits	180.00
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Chemical Engineering

Period of presentation	Year
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Thesis: Chemical engineering 990 (CIR 990)

Qualification	Postgraduate
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Module credits	360.00
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Programmes	PhD Chemical Engineering
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Prerequisites	No prerequisites.
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Language of tuition	Module is presented in English
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Department	Chemical Engineering
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Period of presentation	Year
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Thesis: Environmental engineering 991 (CIR 991)

Qualification	Postgraduate
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Module credits	360.00
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Prerequisites	No prerequisites.
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Language of tuition	Module is presented in English
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Department	Chemical Engineering
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Period of presentation	Year
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Professional and technical communication 310 (CJJ 310)

Qualification	Undergraduate
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Module credits	8.00
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Programmes	BEng Chemical Engineering BEng Chemical Engineering ENGAGE
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Prerequisites	CIR 123
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Contact time	2 lectures per week
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Language of tuition	Module is presented in English
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Department	Chemical Engineering
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Period of presentation	Semester 1
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Module content

Effective communication with engineering and technical audiences, as well as with the community at large, is taught. The emphasis is on written documentation. Formal communication is characterised by: the use of appropriate language and style; effective structuring of information; the use of modern electronic communication technologies, with emphasis on word processing, spreadsheets, appropriate email protocols, effective use of graphic information, effective and correct presentation of numerical data, correct referencing methods, seamless inclusion of mathematics expressions, tables, diagrams and appendices in written work; appropriate methods for levelling communication to the requirements of the target audience.

Kinetics 321 (CKN 321)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Chemical Engineering BEng Chemical Engineering ENGAGE
Prerequisites	(CTD 223)
Contact time	3 tutorials per week, 4 lectures per week
Language of tuition	Module is presented in English
Department	Chemical Engineering
Period of presentation	Semester 2

Module content

Batch reactors; basic reaction kinetics; fitting of experimental reaction data; flow reactor basics.

Environmental nanomaterials 732 (CKO 732)

Qualification	Postgraduate
Module credits	32.00
Programmes	BEngHons Chemical Engineering
Prerequisites	No prerequisites.
Contact time	32 contact hours per semester
Language of tuition	Module is presented in English
Department	Chemical Engineering
Period of presentation	Semester 2

Module content

Introduction to nanotechnology, industrial production of nanomaterials, physico-chemical properties of nanomaterials, identification of nanomaterials sources (point vs diffuse sources) to aquatic systems. Fate, behaviour and transport of nanomaterials in different environmental media (freshwater, sediments, wastewater, and soil). Fractal theory and transformation pathways of nanomaterials: chemical, biological, physical and interactions with macromolecules transformations. Nanoecotoxicology: concept of toxicity within nanomaterials regime, nanomaterials toxicity tests (acute vs. chronic toxicity), mechanisms of nanomaterials toxicity, biocompatibility of nanomaterials, bioaccumulation and persistence. Risk assessment paradigm: Hazard identification (production volumes, material flows, nanowastes generation, bioaccumulation, long-range transport, and persistence), hazard characterization (in vitro vs. in vivo studies, adverse outcome pathways), exposure assessment (life cycle assessment and environmental uptake), risk assessment, and risk management (regulation, nanowastes and by-products management protocols). Sustainable nanotechnology paradigm: safe-by-design concept, risk modelling and predictions.

Laboratory 321 (CLB 321)

Qualification	Undergraduate
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Module credits	16.00
Programmes	BEng Chemical Engineering BEng Chemical Engineering ENGAGE
Prerequisites	CJJ 310/CJJ 210, CHM 226, CPN 321#, CKN 321#, (CMO 310), CIO 320#
Contact time	2 lectures per week, 8 practicals per week
Language of tuition	Separate classes for Afrikaans and English
Department	Chemical Engineering
Period of presentation	Semester 2

Module content

Laboratory safety and general industrial safety practices. Techniques for planning of experiments. Experimental work illustrating: Analysis: Composition of coal and gas, heat of combustion, viscosity. Mass transfer: Gas absorption, batch distillation, azeotropic distillation, fractional distillation and liquid-liquid extraction. Heat transfer: Condenser, shell and tube heat exchanger, heat loss from insulated pipes. Piping system design: Frictional energy loss through pipes and fittings. Measuring equipment: Rate of flow, temperature. Reporting of laboratory results.

Model-based control laboratory 732 (CML 732)

Qualification	Postgraduate
Module credits	32.00
Programmes	BEngHons Control Engineering
Prerequisites	No prerequisites.
Contact time	12 contact hours per semester
Language of tuition	Module is presented in English
Department	Chemical Engineering
Period of presentation	Semester 1 or Semester 2

Mass transfer 310 (CMO 310)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Chemical Engineering BEng Chemical Engineering ENGAGE
Prerequisites	(CTD 223), COP 311#
Contact time	3 tutorials per week, 4 lectures per week
Language of tuition	Module is presented in English
Department	Chemical Engineering
Period of presentation	Semester 1

Module content

Separation by means of equilibrium stages. Design of flash distillation systems, distillation columns, absorbers and strippers by hand and computer calculations. Design of membrane separation systems.

Carbon materials science research and technology 732 (CMS 732)

Qualification	Postgraduate
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Module credits	32.00
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Programmes	BEngHons Chemical Engineering BScHons Applied Science Chemical Technology
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Prerequisites	No prerequisites.
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Contact time	10 lectures per week
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Language of tuition	Module is presented in English
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Department	Chemical Engineering
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Period of presentation	Semester 1 or Semester 2
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General chemistry 117 (CMY 117)

Qualification	Undergraduate
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Module credits	16.00
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Programmes

- BDietetics
- BEd Senior Phase and Further Education and Training Teaching
- BSc Applied Mathematics
- BSc Biochemistry
- BSc Biological Sciences
- BSc Biotechnology
- BSc Chemistry
- BSc Computer Science
- BSc Culinary Science
- BSc Ecology
- BSc Engineering and Environmental Geology
- BSc Entomology
- BSc Environmental Sciences
- BSc Food Science
- BSc Genetics
- BSc Geography
- BSc Geology
- BSc Human Genetics
- BSc Human Physiology
- BSc Human Physiology, Genetics and Psychology
- BSc Mathematics
- BSc Medical Sciences
- BSc Meteorology
- BSc Microbiology
- BSc Nutrition
- BSc Physics
- BSc Plant Science
- BSc Zoology
- BScAgric Agricultural Economics and Agribusiness Management
- BScAgric Animal Science
- BScAgric Applied Plant and Soil Sciences
- BScAgric Plant Pathology

Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Health Sciences Faculty of Veterinary Science
Prerequisites	A candidate must have Mathematics for at least 60% and 60% for Physical Sciences.
Contact time	1 practical per week, 4 lectures per week
Language of tuition	Module is presented in English
Department	Chemistry
Period of presentation	Semester 1

Module content

General introduction to inorganic, analytical and physical chemistry. Atomic structure and periodicity. Molecular structure and chemical bonding using the VSEOR model. Nomenclature of inorganic ions and compounds. Classification of reactions: precipitation, acid-base, redox reactions and gas-forming reactions. Mole concept and stoichiometric calculations concerning chemical formulas and chemical reactions. Principles of reactivity: energy and chemical reactions. Physical behaviour gases, liquids, solids and solutions and the role of intermolecular forces. Rate of reactions: Introduction to chemical kinetics.

General chemistry 127 (CMY 127)

Qualification Undergraduate

Module credits 16.00

Programmes

BDietetics
BEd Senior Phase and Further Education and Training Teaching
BSc Applied Mathematics
BSc Biochemistry
BSc Biological Sciences
BSc Biotechnology
BSc Chemistry
BSc Computer Science
BSc Culinary Science
BSc Ecology
BSc Engineering and Environmental Geology
BSc Entomology
BSc Environmental Sciences
BSc Extended programme - Biological and Agricultural Sciences
BSc Extended programme - Physical Sciences
BSc Food Science
BSc Genetics
BSc Geography
BSc Geology
BSc Human Genetics
BSc Human Physiology
BSc Human Physiology, Genetics and Psychology
BSc Mathematics
BSc Medical Sciences
BSc Meteorology
BSc Microbiology
BSc Nutrition
BSc Physics
BSc Plant Science
BSc Zoology
BScAgric Agricultural Economics and Agribusiness Management
BScAgric Animal Science
BScAgric Applied Plant and Soil Sciences
BScAgric Plant Pathology

Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Health Sciences Faculty of Veterinary Science
Prerequisites	Natural and Agricultural Sciences students: CMY 117 GS or CMY 154 GS Health Sciences students: none
Contact time	1 practical per week, 4 lectures per week
Language of tuition	Module is presented in English
Department	Chemistry
Period of presentation	Semester 2

Module content

Theory: General physical-analytical chemistry: Chemical equilibrium, acids and bases, buffers, solubility equilibrium, entropy and free energy, electrochemistry. Organic chemistry: Structure (bonding), nomenclature, isomerism, introductory stereochemistry, introduction to chemical reactions and chemical properties of organic compounds and biological compounds, i.e. carbohydrates and aminoacids. Practical: Molecular structure (model building), synthesis and properties of simple organic compounds.

Chemistry 133 (CMY 133)

Qualification	Undergraduate
Module credits	8.00
Programmes	BSc Extended programme - Biological and Agricultural Sciences BSc Extended programme - Mathematical Sciences BSc Extended programme - Physical Sciences
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education
Prerequisites	Admission to the relevant programme.
Contact time	2 lectures per week, 3 discussion classes per week, Fortnightly practicals, Foundation Course
Language of tuition	Module is presented in English
Department	Chemistry
Period of presentation	Semester 1

Module content

Bonding and molecular geometry: VSEPR theory; bonding and organic compounds (structural formulas, classification and nomenclature); matter and its properties; mole concept; reaction stoichiometry; reactions in aqueous solutions: precipitation, acid base and redox. Practical laboratory exercises and assignments are based on the themes covered in the module theory component. The UN sustainable development goals #6, 7 & 12 are addressed in a practical on industrial pollution.

Chemistry 143 (CMY 143)

Qualification	Undergraduate
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Module credits	8.00
Programmes	BSc Extended programme - Biological and Agricultural Sciences BSc Extended programme - Mathematical Sciences BSc Extended programme - Physical Sciences
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education
Prerequisites	CMY 133
Contact time	2 lectures per week, 3 discussion classes per week, Fortnightly practicals, Foundation Course
Language of tuition	Module is presented in English
Department	Chemistry
Period of presentation	Semester 1

Module content

Bonding and molecular geometry: VSEPR theory; bonding and organic compounds (structural formulas, classification and nomenclature); matter and its properties; mole concept; reaction stoichiometry; reactions in aqueous solutions: precipitation, acid base and redox.

Chemistry 154 (CMY 154)

Qualification	Undergraduate
Module credits	8.00
Programmes	BSc Extended programme - Biological and Agricultural Sciences BSc Extended programme - Mathematical Sciences BSc Extended programme - Physical Sciences
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education
Prerequisites	CMY 133 and CMY 143
Contact time	2 tutorials per week, 3 lectures per week, Foundation Course, fortnightly practicals
Language of tuition	Module is presented in English
Department	Chemistry
Period of presentation	Semester 1

Module content

Principles of reactivity: energy and chemical reactions. Physical behaviour of gasses, liquids, solids and solutions and the role of intermolecular forces. Rate of reactions: Introduction to Chemical kinetics. Introduction to chemical equilibrium. Introduction to organic chemistry: hybridisation, isomers (structural, geometrical and conformational), additions reactions and reaction mechanisms.

Physical chemistry 382 (CMY 382)

Qualification	Undergraduate
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Module credits	18.00
Programmes	BSc Computer Science
Service modules	Faculty of Education
Prerequisites	CMY 282, CMY 283, CMY 284 and CMY 285
Contact time	1 discussion class per week, 2 practicals per week, 4 lectures per week
Language of tuition	Module is presented in English
Department	Chemistry
Period of presentation	Quarter 4

Module content

Theory: Molecular quantum mechanics. Introduction: Shortcomings of classical physics, dynamics of microscopic systems, quantum mechanical principles, translational, vibrational and rotational movement. Atomic structure and spectra: Atomic hydrogen, multiple electron systems, spectra of complex atoms, molecular structure, the hydrogen molecule ion, diatomic and polyatomic molecules, structure and properties of molecules. Molecules in motion: Viscosity, diffusion, mobility. Surface chemistry: Physisorption and chemisorption, adsorption isotherms, surface tension, heterogeneous catalytic rate reactions, capillarity.

Analytical chemistry 383 (CMY 383)

Qualification	Undergraduate
Module credits	18.00
Programmes	BSc Computer Science
Service modules	Faculty of Education
Prerequisites	CMY 282, CMY 283, CMY 284 and CMY 285
Contact time	1 discussion class per week, 2 practicals per week, 4 lectures per week
Language of tuition	Module is presented in English
Department	Chemistry
Period of presentation	Quarter 1

Module content

Separation methods: Extraction, multiple extraction, chromatographic systems. Spectroscopy: Construction of instruments, atomic absorption and atomic emission spectrometry, surface analysis techniques. Mass spectrometry. These techniques are discussed in terms of their use in environmental analysis and the value they contribute to meeting the UN sustainable development goals (#3,6 & 11). Instrumental electrochemistry. The relevance of electrochemistry to providing affordable and clean energy (UN SDG#7) is addressed.

Organic chemistry 384 (CMY 384)

Qualification	Undergraduate
Module credits	18.00
Programmes	BSc Computer Science

Service modules	Faculty of Education
Prerequisites	CMY 282, CMY 283, CMY 284 and CMY 285
Contact time	1 discussion class per week, 2 practicals per week, 4 lectures per week
Language of tuition	Module is presented in English
Department	Chemistry
Period of presentation	Quarter 3

Module content

Theory: NMR spectroscopy: applications. Aromatic chemistry, Synthetic methodology in organic chemistry. Carbon-carbon bond formation: alkylation at nucleophilic carbon sites, aldol and related condensations, Wittig and related reactions, acylation of carbanions (Claisen condensation). Practical: Laboratory sessions are designed to develop the rational thinking behind the design of organic chemistry experiments. An industrial project specifically prepares students for work in SA industry context and honours projects. As part of this practical programme the UN sustainable development goals must be considered in evaluating the best industrial process.

Transfer processes 311 (COP 311)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Chemical Engineering BEng Chemical Engineering ENGAGE
Prerequisites	WTW 238, (WTW 263)
Contact time	3 tutorials per week, 4 lectures per week
Language of tuition	Module is presented in English
Department	Chemical Engineering
Period of presentation	Semester 1

Module content

Momentum transfer. Fluid statics. Control volume approach for conservation of mass, energy, and momentum. Application to pumps and turbines. Navier-Stokes equations, derivation and applications. Laminar and turbulent boundary layer theory. Heat transfer: fundamentals of heat transfer. Differential equations of heat transfer. Steady state conduction. Introduction to unsteady state conduction. Convection heat transfer and the thermal boundary layer. Radiation heat transfer. Mass transfer: fundamentals of mass transfer. Diffusion and the diffusion coefficient. Differential equations of mass transfer. Steady state molecular diffusion in one or more dimensions.

Program design: Introduction 110 (COS 110)

Qualification	Undergraduate
Module credits	16.00

Programmes	BCom Statistics BEng Computer Engineering BEng Computer Engineering ENGAGE BIS Multimedia BSc Computer Science BSc Extended programme - Mathematical Sciences BSc Information and Knowledge Systems BSc Physics
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Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Economic and Management Sciences Faculty of Natural and Agricultural Sciences
Prerequisites	COS 132 , COS 151 and Maths level 5
Contact time	1 practical per week, 1 tutorial per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Computer Science
Period of presentation	Semester 2

Module content

The focus is on object-oriented (OO) programming. Concepts including inheritance and multiple inheritance, polymorphism, operator overloading, memory management (static and dynamic binding), interfaces, encapsulation, reuse, etc. will be covered in the module. The module teaches sound program design with the emphasis on modular code, leading to well structured, robust and documented programs. A modern OO programming language is used as the vehicle to develop these skills. The module will introduce the student to basic data structures, lists, stacks and queues.

Operating systems 122 (COS 122)

Qualification	Undergraduate
Module credits	16.00
Programmes	BCom Statistics and Data Science BEng Computer Engineering BEng Computer Engineering ENGAGE BIS Multimedia BSc Computer Science BSc Information and Knowledge Systems BSc Mathematical Statistics BSc Physics
Prerequisites	COS 132
Contact time	1 practical per week, 1 tutorial per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Computer Science
Period of presentation	Semester 2

Module content

Fundamental concepts of modern operating systems in terms of their structure and the mechanisms they use are studied in this module. After completing this module, students will have gained, as outcomes, knowledge of real time, multimedia and multiple processor systems, as these will be defined and analysed. In addition, students will have gained knowledge on modern design issues of process management, deadlock and concurrency control, memory management, input/output management, file systems and operating system security. In order to experience a hands-on approach to the knowledge students would have gained from studying the abovementioned concepts, students will have produced a number of practical implementations of these concepts using the Windows and Linux operating systems.

Imperative programming 132 (COS 132)

Qualification Undergraduate

Module credits 16.00

Programmes

BCom Statistics
BCom Statistics and Data Science
BEng Computer Engineering
BEng Computer Engineering ENGAGE
BEng Electrical Engineering
BEng Electrical Engineering ENGAGE
BEng Electronic Engineering
BEng Electronic Engineering ENGAGE
BIS Multimedia
BSc Computer Science
BSc Information and Knowledge Systems
BSc Mathematical Statistics
BSc Physics

Service modules Faculty of Economic and Management Sciences
Faculty of Natural and Agricultural Sciences

Prerequisites APS of 30 and level 5 (60-69%) Mathematics

Contact time 1 practical per week, 1 tutorial per week, 3 lectures per week

Language of tuition Module is presented in English

Department Computer Science

Period of presentation Semester 1

Module content

This module introduces imperative computer programming, which is a fundamental building block of computer science. The process of constructing a program for solving a given problem, of editing it, compiling (both manually and automatically), running and debugging it, is covered from the beginning. The aim is to master the elements of a programming language and be able to put them together in order to construct programs using types, control structures, arrays, functions and libraries. An introduction to object orientation will be given. After completing this module, the student should understand the fundamental elements of a program, the importance of good program design and user-friendly interfaces. Students should be able to conduct basic program analysis and write complete elementary programs.

Introduction to computer science 151 (COS 151)

Qualification	Undergraduate
Module credits	8.00
Programmes	BIS Multimedia BSc Computer Science BSc Information and Knowledge Systems BSc Mathematical Statistics BSc Physics
Service modules	Faculty of Education Faculty of Natural and Agricultural Sciences
Prerequisites	APS of 30 and level 5 (60-69%) Mathematics.
Contact time	1 practical per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Computer Science
Period of presentation	Semester 1

Module content

This module introduces concepts and terminology related to the computer science discipline. General topics covered include the history of computing, machine level representation of data, Boolean logic and gates, basic computer systems organisation, algorithms and complexity and automata theory. The module also introduces some of the subdisciplines of computer science, such as computer networks, database systems, compilers, information security and intelligent systems. The module also focuses on modelling of algorithms.

Theoretical computer science 210 (COS 210)

Qualification	Undergraduate
Module credits	8.00
Programmes	BSc Computer Science BSc Information and Knowledge Systems BSc Physics
Prerequisites	COS 110 and COS 151
Contact time	1 practical per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Computer Science
Period of presentation	Semester 1

Module content

This module introduces students to a framework for investigating both computability and complexity of problems. Topics include, but are not limited to: finite-state machines, regular expressions and their application in a language such as awk, the Halting problem, context-free grammars, P vs NP problem, NP-complete class, reduction techniques, regular languages, DFAs and NFAs, Lattices, Church-Turing thesis.

Data structures and algorithms 212 (COS 212)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Computer Engineering BEng Computer Engineering ENGAGE BIS Multimedia BSc Computer Science BSc Information and Knowledge Systems BSc Physics
Service modules	Faculty of Natural and Agricultural Sciences
Prerequisites	COS 110
Contact time	1 practical per week, 4 lectures per week
Language of tuition	Module is presented in English
Department	Computer Science
Period of presentation	Semester 1

Module content

Data abstraction is a fundamental concept in the design and implementation of correct and efficient software. In prior modules, students are introduced to the basic data structures of lists, stacks and queues. This module continues with advanced data structures such as trees, hash tables, heaps and graphs, and goes into depth with the algorithms needed to manipulate them efficiently. Classical algorithms for sorting, searching, traversing, packing and game playing are included, with an emphasis on comparative implementations and efficiency. At the end of this module, students will be able to identify and recognise all the classical data structures; implement them in different ways; know how to measure the efficiency of implementations and algorithms; and have further developed their programming skills, especially with recursion and polymorphism.

Software modelling 214 (COS 214)

Qualification	Undergraduate
Module credits	16.00
Programmes	BIS Multimedia BSc Computer Science BSc Information and Knowledge Systems
Prerequisites	COS 212
Contact time	1 practical per week, 4 lectures per week
Language of tuition	Module is presented in English
Department	Computer Science
Period of presentation	Semester 2

Module content

The module will introduce the concepts of model-driven analysis and design as a mechanism to develop and evaluate complex software systems. Systems will be decomposed into known entities, such as design patterns, classes, relationships, execution loops and process flow, in order to model the semantic aspects of the system in terms of structure and behaviour. An appropriate tool will be used to support the software modelling. The role of the software model in the enterprise will be highlighted. Students who successfully complete this module will be able to conceptualise and analyse problems and abstract a solution.

Netcentric computer systems 216 (COS 216)

Qualification	Undergraduate
Module credits	16.00
Programmes	BIS Multimedia BSc Computer Science BSc Information and Knowledge Systems
Prerequisites	COS 110
Contact time	1 practical per week, 4 lectures per week
Language of tuition	Module is presented in English
Department	Computer Science
Period of presentation	Semester 1

Module content

This module will introduce the student to netcentric systems by focusing on the development of systems for the web, mobile devices and the cloud. To lay the foundation on which the rest of the module can follow, traditional web-based programming languages such as HTML5, JavaScript, CSS and Python will be covered differentiating between client-side and server-side computation. Persistence of web-based data will be included for both client and server-based computation. These technologies will be extended and applied to mobile platforms where the availability of a connection, location-services and mobile device limitations play a role. For cloud platforms, aspects relating to task partitioning, security, virtualisation, cloud storage and access to the shared data stores, data synchronisation, partitioning and replication are considered. In order to practically demonstrate that a student has reached these outcomes, students will be required to use, integrate and maintain the necessary software and hardware by completing a number of smaller practical assignments where after integrating all these technologies into a comprehensive and practical programming project is required.

Introduction to database systems 221 (COS 221)

Qualification	Undergraduate
Module credits	16.00
Programmes	BSc Computer Science BSc Information and Knowledge Systems
Prerequisites	COS 110
Contact time	1 practical per week, 4 lectures per week
Language of tuition	Module is presented in English

Department	Computer Science
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Period of presentation	Semester 1
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Module content

This module will expose students to the evolution of databases systems. They will be able to model data conceptually, in terms of models such as conceptual, relational, object oriented, graph-based and network and the mapping between models, in particular between the conceptual and relational model. Foundational concepts relating to the relational model will be considered, such as: entity and referential integrity, relational algebra and calculus, functional dependency, normal forms, Indexing of database systems and transaction processing will also form an integral part of the curriculum. The physical data representation of the databases system both in memory and within the file system of the operating system will be considered.

Concurrent systems 226 (COS 226)

Qualification	Undergraduate
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Module credits	16.00
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Programmes	BIS Multimedia BSc Computer Science BSc Information and Knowledge Systems BSc Physics
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Prerequisites	COS 122 and COS 212
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Contact time	1 practical per week, 4 lectures per week
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Language of tuition	Module is presented in English
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Department	Computer Science
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Period of presentation	Semester 2
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Module content

Computer science courses mostly deal with sequential programs. This module looks at the fundamentals of concurrency; what it means, how it can be exploited, and what facilities are available to determine program correctness. Concurrent systems are designed, analysed and implemented.

Computer organisation and architecture 284 (COS 284)

Qualification	Undergraduate
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Module credits	16.00
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Programmes	BIS Multimedia BSc Computer Science BSc Information and Knowledge Systems BSc Physics
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Prerequisites	COS 212 GS
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Contact time	1 practical per week, 4 lectures per week
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Language of tuition	Module is presented in English
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Department	Computer Science
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Period of presentation	Semester 2
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Module content

This module provides the foundations on which other modules build by enabling a deeper understanding of how software interacts with hardware. It will teach the design and operation of modern digital computers by studying each of the components that make up a digital computer and the interaction between these components. Specific areas of interest, but not limited to, are: representation of data on the machine-level; organisation of the machine on the assembly level; the architecture and organisation of memory; inter- and intra-component interfacing and communication; data paths and control; and parallelism. Topic-level detail and learning outcomes for each of these areas are given by the first 6 units of 'Architecture and Organisation' knowledge area as specified by the ACM/IEEE Computer Science Curriculum 2013.

The concepts presented in the theory lectures will be reinforced during the practical sessions by requiring design and implementation of the concepts in simulators and assembly language using an open source operating system.

Software engineering 301 (COS 301)

Qualification	Undergraduate
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Module credits	27.00
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Programmes	BIS Multimedia BSc Computer Science BSc Information and Knowledge Systems
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Prerequisites	COS 212 and COS 214
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Contact time	1 practical per week, 2 lectures per week
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Language of tuition	Module is presented in English
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Department	Computer Science
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Period of presentation	Year
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Module content

The module exposes students to problems associated with software development on an industrial scale. Overall goals of the module are: to become familiar with the latest trends in software engineering; to understand the software engineering process and to appreciate its complexity; to be exposed to a variety of methodologies for tackling different stages of the software lifecycle; to understand and apply the concepts of systems administration and maintenance; to complete the development of a fairly large object orientation-based software product. The focus of the module is on a project that lasts the whole year. The project is completed in groups of approximately four (4) students and teaches students to take responsibility for a variety of roles within a group, and to understand the different requirements for these; to experience the advantages and problems of working in a group; professionalism with regards to particularly colleagues and clients.

After the successful completion of this module, the student will be able to: understand the psychology of a client; work in groups; and have an appreciation for planning, designing, implementing and maintaining large projects. These qualities should place the students in a position in which they are able to handle software development in the corporate environment.

Artificial intelligence 314 (COS 314)

Qualification	Undergraduate
Module credits	18.00
Programmes	BIS Multimedia BSc Computer Science BSc Information and Knowledge Systems BSc Physics
Prerequisites	COS 110
Contact time	1 practical per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Computer Science
Period of presentation	Semester 1

Module content

The main objective of this module is to introduce a selection of topics from artificial intelligence (AI), and to provide the student with the background to implement AI techniques for solving complex problems. This module will cover topics from classical AI, as well as more recent AI paradigms. These topics include: search methods, game playing, knowledge representation and reasoning, machine learning, neural networks, genetic algorithms, artificial life, planning methods, and intelligent agents. In the practical part of this module, students will get experience in implementing

- (1) game trees and evolving game-playing agents;
- (2) a neural network and applying it to solve a real-world problem; and
- (3) a genetic algorithm and applying it to solve a real-world problem.

Database systems 326 (COS 326)

Qualification	Undergraduate
Module credits	18.00
Programmes	BIS Multimedia BSc Computer Science BSc Information and Knowledge Systems
Prerequisites	COS 221
Contact time	1 lecture per week, 2 practicals per week
Language of tuition	Module is presented in English
Department	Computer Science
Period of presentation	Semester 2

Module content

This module builds on a prior introductory module on database technology and provides more advanced theoretical and practical study material for managing large volumes of data, for example, noSQL database systems and MapReduce. The module will consider file system models, for example Hadoop, relevant for big data storage, manipulation at scale, mining and visualisation. Basic knowledge of parallel decomposition concepts will be included.

Computer security and ethics 330 (COS 330)

Qualification	Undergraduate
Module credits	18.00
Programmes	BIS Multimedia BSc Computer Science BSc Information and Knowledge Systems BSc Physics
Prerequisites	COS 110
Contact time	1 practical per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Computer Science
Period of presentation	Semester 2

Module content

This module develops an appreciation of the fundamentals and design principles for information assurance and security. Students will develop a clear understanding of the basic information security services and mechanisms, enabling them to design and evaluate the integration of solutions into the user application environment. Emphasis will be placed on services such as authorisation and confidentiality. Students will acquire knowledge and skills of Security Models such as the Bell-LaPadula, Harrison-Ruzzo Ullman and Chinese Wall Model. Students will develop a detailed understanding of the confidentiality service by focusing on cryptology and the practical implementation thereof. The student will be introduced to professional and philosophical ethics. At the end of the module students will be able to engage in a debate regarding the impact (local and global) of computers on individuals, organisations and society. The professionalism of IT staff will be discussed against national and international codes of practices such as those of the CSSA, ACM and IEEE.

Computer networks 332 (COS 332)

Qualification	Undergraduate
Module credits	18.00
Programmes	BIS Multimedia BSc Computer Science BSc Information and Knowledge Systems
Prerequisites	COS 216
Contact time	1 practical per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Computer Science
Period of presentation	Semester 1

Module content

The objective of this module is to acquaint the student with the terminology of communication systems and to establish a thorough understanding of exactly how data is transferred in such communication networks, as well as applications that can be found in such environments. The study material includes: concepts and terminology, the hierarchy of protocols according to the OSI and TCP/IP models, protocols on the data level, physical level and network level as well as higher level protocols. The practical component of the module involves programming TCP/IP sockets using a high level language. The emphasis throughout is on the technical aspects underlying the operation of networks, rather than the application of networks.

Programming languages 333 (COS 333)

Qualification	Undergraduate
Module credits	18.00
Programmes	BIS Multimedia BSc Computer Science BSc Information and Knowledge Systems BSc Physics
Prerequisites	COS 110
Contact time	1 practical per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Computer Science
Period of presentation	Semester 2

Module content

Programming languages are the backbone for software development. Each language has its own different syntax and semantics, but there are many common concepts that can be studied and then illustrated through the languages. The module concentrates on issues of object orientation, including delegation, iteration and polymorphism. It surveys how languages provide the basic building blocks for data and control, as well as exception handling and concurrency. At the end of the module, students will be able to appreciate the rich history behind programming languages, leading to independent principles that evolve over time. They will be skilled at using a variety of programming languages, including new paradigms such as functional, logical and scripting, and will know how to learn a new language with ease. From this experience, they will be able to apply evaluation criteria for choosing an appropriate programming language in a given scenario.

Compiler construction 341 (COS 341)

Qualification	Undergraduate
Module credits	18.00
Programmes	BIS Multimedia BSc Computer Science
Prerequisites	COS 211 and COS 212
Contact time	1 practical per week, 2 lectures per week
Language of tuition	Module is presented in English

Department	Computer Science
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Period of presentation	Semester 1
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Module content

This module will introduce the student to the fundamentals of compiler construction. These include: the structural difference between a high-level and a von-Neumann language, the meaning of syntax and semantics and what semantics-preserving correctness means; the concepts of regular expressions, finite automata, context-free grammars in the context of programming languages; the need to construct parse-trees for given programmes; the application of data structures and algorithms for the purpose of code-analysis, code-optimisation and register-allocation; and the limits of code-analysis in terms of undecideability and the halting problem.

After successful completion of the module, the student will have an understanding of the importance of compilers and will understand how to implement a compiler, in terms of its components, the scanner, parser, type checker and code-generator for a given grammar.

Computer graphics 344 (COS 344)

Qualification	Undergraduate
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Module credits	18.00
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Programmes	BIS Multimedia BSc Computer Science BSc Information and Knowledge Systems BSc Physics
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Prerequisites	COS 110 and WTW 124 or WTW 146
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Contact time	1 practical per week, 2 lectures per week
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Language of tuition	Module is presented in English
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Department	Computer Science
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Period of presentation	Semester 1
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Module content

The aim of this module is to acquire a sound knowledge of the basic theory of interactive computer graphics and basic computer graphics programming techniques. The theory will cover graphics systems and models, graphics programming, input and interaction, geometric objects and transformations, viewing in 3D, shading, rendering techniques, and introduce advanced concepts, such as object-oriented computer graphics and discrete techniques. The module includes a practical component that enables students to apply and test their knowledge in computer graphics. The OpenGL graphics library and the C programming language will be used for this purpose.

Computer and information security (I) 420 (COS 420)

Qualification	Undergraduate
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Module credits	15.00
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Prerequisites	COS 301 and at least two COS modules at third-year level.
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Language of tuition	Module is presented in English
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Department	Computer Science
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Period of presentation	Semester 1 or Semester 2
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Module content

This module focuses on state-of-the-art security topics that are current and relevant to industry. The curriculum for the module is determined annually to reflect the current research directions as pursued by the information and Computer Security Architectures (ICSA) research group. The main topics include, but are not limited to: Applied security, including operating system security, secure coding, and cryptography; Trust and trust management systems; Privacy and privacy-enhanced technologies; Social Engineering. Students will be challenged to contribute innovative research ideas in the field of Computer Security by completing a number of mini projects such as writing research papers and writing software programs.

Software engineering (I) 430 (COS 430)

Qualification	Undergraduate
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Module credits	15.00
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Prerequisites	COS 301 and at least two COS modules at third-year level.
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Contact time	2 lectures per week
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Language of tuition	Module is presented in English
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Department	Computer Science
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Period of presentation	Semester 1 or Semester 2
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Module content

This module covers various perspectives of Software Engineering theory and practices. It provides an overview both of the challenges in contemporary software engineering (such as scale, complexity and urgency) and of the recommended practices for overcoming these challenges. It will familiarise students with both the historical and current theories about activities for the design, development, deployment and ongoing operation of software. It will show how these activities aim to be predictable, repeatable, robust, value-producing, and how they aim to meet the specified requirements for the intended system users. It will also emphasise that standardisation and reuse can be important factors in successfully engineering software. The module assumes prior knowledge about Software Engineering at the level of an introductory/undergraduate module.

Software engineering (II) 431 (COS 431)

Qualification	Undergraduate
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Module credits	15.00
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Prerequisites	COS 301 and at least two COS modules at third-year level.
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Contact time	2 lectures per week
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Language of tuition	Module is presented in English
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Department	Computer Science
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Period of presentation	Semester 1 or Semester 2
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Module content

This module discusses software architecture, including the representation of designs, definitions, styles and patterns of architecture. Its themes include model-driven architecture, formal modelling and analysis, and architectural description languages. The module will show that the architecture of a software system is determined by the collection of significant design decisions made early on in the development of that system – decisions concerning the components comprising the system, repeating-patterns of system-wide aspects, and the platforms on which the system will be built. It will discuss how, once these decisions are made and subsequently followed, they end up profoundly affecting the development, deployment, use and ongoing enhancement of that system. The module assumes that the student is familiar with software development lifecycle concepts, and that she/he has been part of at least one significant software development effort. Those who have not completed COS 430 will be provided additional background.

Formal aspects of computing (I) 440 (COS 440)

Qualification	Undergraduate
Module credits	15.00
Prerequisites	COS 301 and at least two COS modules at third-year level.
Language of tuition	Module is presented in English
Department	Computer Science
Period of presentation	Semester 1 or Semester 2

Module content

The focus of this module is on a formal approach to deriving algorithms, known as “correctness by construction”. It relies on Dijkstra's guarded command language (GCL) for specifying the derived algorithms. The requirements of an algorithm are initially stated in terms of a pre- and a post-condition, specified in first order predicate logic. Strategies are given for progressively refining these specifications to GCL notation which can, in turn, easily be translated into a conventional programming language. The surprising power of the method will be demonstrated. Not only are algorithms guaranteed to be correct (in the same sense that the proof of a mathematical theorem is guaranteed to be correct); they frequently turn out to be remarkably efficient. In the early part of the module, a number of well-known algorithms (such as linear and binary search, raising a number to an integer power, finding the approximate log of a number, etc) will be derived in order to become thoroughly familiar with the approach. Later various intermediate level algorithms will be derived (such as simple raster drawing algorithms, pattern matching algorithms, finding the longest string of a certain type, an algorithm to solve the majority voting problem, etc). Finally, the method will be used to derive state-of-the-art algorithms to minimize finite automata and to construct formal concept lattices. The theory necessary to understand these topics will be provided. The value-objectives of the module are: to develop an appreciation that theory can be effectively deployed to solve practical problems; to value the elegance of the algorithmic solutions; and to value a correctness-by-construction mindset over one that is content with debugging into correctness. A basic understanding is assumed of first order predicate logic, as well as competency in mathematical reasoning.

Formal aspects of computing (II) 441 (COS 441)

Qualification	Undergraduate
Module credits	15.00
Prerequisites	COS 301 and at least two COS modules at third-year level.

Contact time	2 lectures per week
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Language of tuition	Module is presented in English
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Department	Computer Science
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Period of presentation	Semester 1 or Semester 2
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Module content

The status of Computer Science, including software science, as a proper “science” is closely related with our ability to construct accurate and precise models of the structures and processes of computational systems. The precision of these models is closely related with our ability to express them in formal notations with mathematical rigour, such that it also becomes possible to reason formally about relevant and interesting properties of these models. Examples of such interesting properties are logical consistency (i.e. absence of inherent contradictions), or safety properties such as deadlock freeness. This module focuses on formal languages and techniques which are suitable for such purposes. Of particular importance are process algebras with which systems of parallel and concurrent computation can be formally described. Other suitable formalisms may be discussed as well, such that the contents of this module may slightly vary from year to year.

Educational software development 450 (COS 450)

Qualification	Undergraduate
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Module credits	15.00
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Prerequisites	COS 301 and at least two COS modules at third-year level.
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Contact time	2 lectures per week
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Language of tuition	Module is presented in English
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Department	Computer Science
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Period of presentation	Semester 1 or Semester 2
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Module content

This module provides the foundation to evaluate and develop educational software. It will introduce didactic principles applicable to the discipline of Computer Science. Using these principles, educational software, such as tools for teaching programming, on-line testing software, and adaptive software to name a few, can be evaluated and developed. Computer Science topics of interest are: programming environments, persistence of information and knowledge, knowledge representation etc.

Data mining 481 (COS 481)

Qualification	Undergraduate
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Module credits	15.00
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Prerequisites	COS 301 and at least two COS modules at third-year level.
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Contact time	2 lectures per week
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Language of tuition	Module is presented in English
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Department	Computer Science
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Period of presentation	Semester 1 or Semester 2
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Module content

Data mining is the extraction of novel knowledge, or hidden patterns, from large data bases. The focus of this course is on how the computational intelligence techniques (such as evolutionary algorithms, swarm algorithms and neural networks) can be used for knowledge extraction. In addition, traditional machine learning techniques (such as decision trees and rule induction) will be covered. The pre-processing of data in preparation for data mining algorithms, as well as the post-processing of results after data mining, will be discussed. Exploratory data analysis and statistical data mining methods are also investigated. Finally, some attention will be given to more modern problems, such as the extraction of hidden knowledge from unstructured data, such as text and images. It is highly recommended that students do COS 410 and COS 411, as knowledge of these modules are assumed.

Generic programming 482 (COS 482)

Qualification	Undergraduate
Module credits	15.00
Prerequisites	COS 301 and at least two COS modules at third-year level.
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Computer Science
Period of presentation	Semester 1 or Semester 2

Module content

This module introduces the concepts of generic programming in order to generate code at compile-time. Of particular interest is the automatic generation of design pattern implementations at compile-time for use at run-time. To this end, design patterns and compile-time programming techniques such as: basic compile-time programming constructs, object allocation, generalised functors, smart pointer and multi-methods are discussed in detail and applied to design patterns.

Digital forensics and investigations 483 (COS 483)

Qualification	Undergraduate
Module credits	15.00
Prerequisites	COS 301 and at least two COS modules at third-year level.
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Computer Science
Period of presentation	Semester 1 or Semester 2

Module content

This module will teach the basic theoretical concepts of digital forensic investigations. This module is designed to prepare a student for a wide range of people including, but not limited to, law enforcers, crime investigators and people responsible for internal incident investigations in larger organisations. Digital forensics is a relatively new and upcoming field. It is a field that is not well known by most organisations and therefore, such organisations are ill informed about the digital forensic processes required to conduct a successful digital forensic investigation. The large number of digital devices used to commit crimes or other related incidents, such as fraud and corruption, proved motivation for this module in order to investigate and combat these incidents successfully. The main topics covered, but not limited to, include: An introduction to Digital Forensics; Digital forensic processes; Hardware forensics; Digital forensics tools (software forensics); Forensic readiness; A digital forensics laboratory/facility; Network forensics; Live forensics; Professionalism and ethics in digital forensics; Cyber forensics; Cyber law. Students will be challenged to contribute innovative research ideas in the field of Digital Forensics by completing a number of mini projects such as writing research papers and writing software programs.

Computer networks 484 (COS 484)

Qualification	Undergraduate
Module credits	15.00
Prerequisites	COS 301 and at least two COS modules at third-year level.
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Computer Science
Period of presentation	Semester 1 or Semester 2

Module content

This module covers computer networking principles and the operation of the TCP/IP protocol suite. The module includes studying the operation of relevant protocols, administration of network services, troubleshooting, as well as network design issues and challenges. Prior knowledge is assumed on basic data communications principles, the ISO OSI reference model, and the basic operation of protocols in the TCP/IP protocol suite.

Parallel and distributed computing 486 (COS 486)

Qualification	Undergraduate
Module credits	15.00
Prerequisites	COS 301 and at least two COS modules at third-year level.
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Computer Science
Period of presentation	Semester 1 or Semester 2

Module content

Computational science relies on the analysis of often complex models, for its empirical data and analyses typically involve an enormous amount of calculations. Parallel computing is one means of reducing the time needed to complete such calculations. This module will examine the kinds of problems that lend themselves to parallel computation and the methods for implementing programs to solve such problems. The aim of the module is to provide a background for parallel and distributed computing as well as practical knowledge of the implementation of computational experiments.

Research report 700 (COS 700)

Qualification	Postgraduate
Module credits	30.00
Programmes	BScHons Computer Science
Prerequisites	No prerequisites.
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Computer Science
Period of presentation	Year

Module content

This module requires the student to conduct independent research under supervision of a staff member on a topic agreed upon by the student and staff member. The module consists of two parts: Research methods and the project. During the first semester, formal lectures will be presented on best research practices (counting 10 credits). The project (counting 20 credits) involves application of the taught research methods to complete a research project. The project serves as an opportunity for the student to explore one of the department's areas of research in greater depth. The end product may be a new piece of software, a model or an algorithm, or an extension of these. It could be an experimental, or theoretical piece of reasoning. The final outcome of the project is a technical report.

Artificial intelligence (I) 710 (COS 710)

Qualification	Postgraduate
Module credits	15.00
Programmes	BScHons Computer Science
Prerequisites	No prerequisites.
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Computer Science
Period of presentation	Semester 1 or Semester 2

Module content

This module focuses on two Computational Intelligence paradigms, namely Evolutionary Computation and Swarm Intelligence. Within the Evolutionary Computation paradigm, algorithmic models of Darwinian evolution will be studied, including genetic algorithms, genetic programming, evolutionary strategies, evolutionary programming, differential evolution, cultural algorithms and co-evolution. Within the Swarm Intelligence paradigm algorithm models of social organisms found in nature will be studied, including ant algorithms and particle swarm optimisation. These algorithms will mostly be studied in the context of complex optimisation problems, including multi-objective optimisation, dynamic environments, constraints, and finding multiple solutions. Prior knowledge assumed include good programming skills and an undergraduate module in calculus.

Artificial Intelligence (II) 711 (COS 711)

Qualification	Postgraduate
Module credits	15.00
Programmes	BScHons Computer Science
Prerequisites	No prerequisites.
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Computer Science
Period of presentation	Semester 1 or Semester 2

Module content

This module focuses on three Computational Intelligence paradigms, namely Artificial Neural Networks, Artificial Immune Systems, and Fuzzy Systems. Within the Artificial Neural Networks paradigm algorithmic models of neural learning will be studied, including supervised, unsupervised, and reinforcement learning. Aspects that influence the performance of artificial neural networks will be studied in depth. Within the Artificial Immune Systems paradigm algorithm models of different views of the human biological immune system will be studied, including negative selection, clonal selection, network theory and danger theory models. The Fuzzy Systems paradigm include models of reasoning with uncertainty, specifically fuzzy logic and rough sets. Prior knowledge assumed include good programming skills and an undergraduate module in calculus.

Computer and information security (I) 720 (COS 720)

Qualification	Postgraduate
Module credits	15.00
Programmes	BScHons Computer Science
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Computer Science
Period of presentation	Semester 1 or Semester 2

Module content

This module focuses on state-of-the-art security topics that are current and relevant to industry. The curriculum for the module is determined annually to reflect the current research directions as pursued by the information and Computer Security Architectures (ICSA) research group. The main topics include, but are not limited to: Applied security, including operating system security, secure coding, and cryptography; Trust and trust management systems; Privacy and privacy-enhanced technologies; Social Engineering. Students will be challenged to contribute innovative research ideas in the field of Computer Security by completing a number of mini projects such as writing research papers and writing software programs.

Computer and information security (II) 721 (COS 721)

Qualification	Postgraduate
Module credits	15.00
Programmes	BScHons Computer Science
Prerequisites	No prerequisites.
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Computer Science
Period of presentation	Semester 1 or Semester 2

Module content

This module focuses on state-of-the-art information security topics that are current and relevant to industry. The curriculum for this module is annually determined to reflect the current research directions as pursued by the Information and Computer Security Architectures (ICSA) research group. The main topics include, but are not limited to: Information security management, including policies, standards and procedures; Risk management; Privacy; Ethics; Legal issues in Information Security; Information security services and technologies. Students will be challenged to contribute innovative research ideas in the field of Information Security Management by completing a number of mini projects such as writing research papers and writing software programs.

Software engineering (I) 730 (COS 730)

Qualification	Postgraduate
Module credits	15.00
Programmes	BScHons Computer Science
Prerequisites	No prerequisites.
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Computer Science
Period of presentation	Semester 1 or Semester 2

Module content

This module covers various perspectives of Software Engineering theory and practices. It provides an overview both of the challenges in contemporary software engineering (such as scale, complexity and urgency) and of the recommended practices for overcoming these challenges. It will familiarise students with both the historical and current theories about activities for the design, development, deployment and ongoing operation of software. It will show how these activities aim to be predictable, repeatable, robust, value-producing, and how they aim to meet the specified requirements for the intended system users. It will also emphasise that standardisation and reuse can be important factors in successfully engineering software. The module assumes prior knowledge about Software Engineering at the level of an introductory/undergraduate module.

Software engineering (II) 731 (COS 731)

Qualification	Postgraduate
Module credits	15.00
Programmes	BScHons Computer Science
Prerequisites	No prerequisites.
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Computer Science
Period of presentation	Semester 1 or Semester 2

Module content

This module discusses software architecture, including the representation of designs, definitions, styles and patterns of architecture. Its themes include model-driven architecture, formal modelling and analysis, and architectural description languages. The module will show that the architecture of a software system is determined by the collection of significant design decisions made early on in the development of that system – decisions concerning the components comprising the system, repeating-patterns of system-wide aspects, and the platforms on which the system will be built. It will discuss how, once these decisions are made and subsequently followed, they end up profoundly affecting the development, deployment, use and ongoing enhancement of that system. The module assumes that the student is familiar with software development lifecycle concepts, and that she/he has been part of at least one significant software development effort. Those who have not completed COS730 will be provided additional background.

Formal aspects of computing (I) 740 (COS 740)

Qualification	Postgraduate
Module credits	15.00
Programmes	BScHons Computer Science
Prerequisites	No prerequisites.
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Computer Science

Period of presentation	Semester 1 or Semester 2
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Module content

The focus of this module is on a formal approach to deriving algorithms, known as “correctness by construction”. It relies on Dijkstra's guarded command language (GCL) for specifying the derived algorithms. The requirements of an algorithm are initially stated in terms of a pre- and a post-condition, specified in first order predicate logic. Strategies are given for progressively refining these specifications to GCL notation which can, in turn, easily be translated into a conventional programming language. The surprising power of the method will be demonstrated. Not only are algorithms guaranteed to be correct (in the same sense that the proof of a mathematical theorem is guaranteed to be correct); they frequently turn out to be remarkably efficient. In the early part of the module, a number of well-known algorithms (such as linear and binary search, raising a number to an integer power, finding the approximate log of a number, etc) will be derived in order to become thoroughly familiar with the approach. Later various intermediate level algorithms will be derived (such as simple raster drawing algorithms, pattern matching algorithms, finding the longest string of a certain type, an algorithm to solve the majority voting problem, etc). Finally, the method will be used to derive state-of-the-art algorithms to minimize finite automata and to construct formal concept lattices. The theory necessary to understand these topics will be provided. The value-objectives of the module are: to develop an appreciation that theory can be effectively deployed to solve practical problems; to value the elegance of the algorithmic solutions; and to value a correctness-by-construction mindset over one that is content with debugging into correctness. A basic understanding is assumed of first order predicate logic, as well as competency in mathematical reasoning.

Formal aspects of computing (II) 741 (COS 741)

Qualification	Postgraduate
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Module credits	15.00
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Programmes	BScHons Computer Science
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Prerequisites	No prerequisites.
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Contact time	2 lectures per week
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Language of tuition	Module is presented in English
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Department	Computer Science
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Period of presentation	Semester 1 or Semester 2
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Module content

The status of Computer Science, including software science, as a proper “science” is closely related with our ability to construct accurate and precise models of the structures and processes of computational systems. The precision of these models is closely related with our ability to express them in formal notations with mathematical rigour, such that it also becomes possible to reason formally about relevant and interesting properties of these models. Examples of such interesting properties are logical consistency (i.e. absence of inherent contradictions), or safety properties such as deadlock freeness. This modules focuses on formal languages and techniques which are suitable for such purposes. Of particular importance are process algebras with which systems of parallel and concurrent computation can be formally described. Other suitable formalisms may be discussed as well, such that the contents of this module may slightly vary from year to year.

Educational software development 750 (COS 750)

Qualification	Postgraduate
Module credits	15.00
Programmes	BScHons Computer Science
Prerequisites	No prerequisites.
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Computer Science
Period of presentation	Semester 1 or Semester 2

Module content

This module provides the foundation to evaluate and develop educational software. It will introduce didactic principles applicable to the discipline of Computer Science. Using these principles, educational software, such as tools for teaching programming, on-line testing software, and adaptive software to name a few, can be evaluated and developed. Computer Science topics of interest are: programming environments, persistence of information and knowledge, knowledge representation etc.

Data mining 781 (COS 781)

Qualification	Postgraduate
Module credits	15.00
Programmes	BScHons Computer Science
Prerequisites	No prerequisites.
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Computer Science
Period of presentation	Semester 1 or Semester 2

Module content

Data mining is the extraction of novel knowledge, or hidden patterns, from large data bases. The focus of this course is on how the computational intelligence techniques (such as evolutionary algorithms, swarm algorithms and neural networks) can be used for knowledge extraction. In addition, traditional machine learning techniques (such as decision trees and rule induction) will be covered. The pre-processing of data in preparation for data mining algorithms, as well as the post-processing of results after data mining, will be discussed. Exploratory data analysis and statistical data mining methods are also investigated. Finally, some attention will be given to more modern problems, such as the extraction of hidden knowledge from unstructured data, such as text and images. It is highly recommended that students do COS710 and COS711, as knowledge of these modules are assumed.

Generic programming 782 (COS 782)

Qualification	Postgraduate
Module credits	15.00
Programmes	BScHons Computer Science

Prerequisites	No prerequisites.
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Computer Science
Period of presentation	Semester 1 or Semester 2

Module content

This module introduces the concepts of generic programming in order to generate code at compile-time. Of particular interest is the automatic generation of design pattern implementations at compile-time for use at run-time. To this end, design patterns and compile-time programming techniques such as: basic compile-time programming constructs, object allocation, generalised functors, smart pointer and multi-methods are discussed in detail and applied to design patterns.

Digital forensics and investigations 783 (COS 783)

Qualification	Postgraduate
Module credits	15.00
Programmes	BScHons Computer Science
Prerequisites	No prerequisites.
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Computer Science
Period of presentation	Semester 1 or Semester 2

Module content

This module will teach the basic theoretical concepts of digital forensic investigations. This module is designed to prepare a student for a wide range of people including, but not limited to, law enforcers, crime investigators and people responsible for internal incident investigations in larger organisations. Digital forensics is a relatively new and upcoming field. It is a field that is not well known by most organisations and therefore, such organisations are ill informed about the digital forensic processes required to conduct a successful digital forensic investigation. The large number of digital devices used to commit crimes or other related incidents, such as fraud and corruption, proved motivation for this module in order to investigate and combat these incidents successfully. The main topics covered, but not limited to, include: An introduction to Digital Forensics; Digital forensic processes; Hardware forensics; Digital forensics tools (software forensics); Forensic readiness; A digital forensics laboratory/facility; Network forensics; Live forensics; Professionalism and ethics in digital forensics; Cyber forensics; Cyber law. Students will be challenged to contribute innovative research ideas in the field of Digital Forensics by completing a number of mini projects such as writing research papers and writing software programs.

Computer networks 784 (COS 784)

Qualification	Postgraduate
Module credits	15.00

Programmes	BScHons Computer Science
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Prerequisites	No prerequisites.
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Contact time	2 lectures per week
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Language of tuition	Module is presented in English
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Department	Computer Science
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Period of presentation	Semester 1 or Semester 2
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Module content

This module covers computer networking principles and the operation of the TCP/IP protocol suite. The module includes studying the operation of relevant protocols, administration of network services, troubleshooting, as well as network design issues and challenges. Prior knowledge is assumed on basic data communications principles, the ISO OSI reference model, and the basic operation of protocols in the TCP/IP protocol suite.

Computer graphics 785 (COS 785)

Qualification	Postgraduate
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Module credits	15.00
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Programmes	BScHons Computer Science
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Prerequisites	No prerequisites.
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Contact time	2 lectures per week
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Language of tuition	Module is presented in English
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Department	Computer Science
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Period of presentation	Semester 1 or Semester 2
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Module content

This module is intended as an advanced module in real-time computer graphics and shader programming. The module includes the following topics: Advanced texture mapping, curves and curved surfaces, shadow mapping, skeletal animation, particle systems, ray tracing and collision detection. The module assumes prior knowledge of introductory graphics as presented in an undergraduate module and a working knowledge of linear algebra and calculus.

Parallel and distributed computing 786 (COS 786)

Qualification	Postgraduate
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Module credits	15.00
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Programmes	BScHons Computer Science
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Prerequisites	No prerequisites.
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Contact time	2 lectures per week
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Language of tuition	Module is presented in English
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Department	Computer Science
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Period of presentation	Semester 1 or Semester 2
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Module content

Computational science relies on the analysis of often complex models, for its empirical data and analyses typically involve an enormous amount of calculations. Parallel computing is one means of reducing the time needed to complete such calculations. This module will examine the kinds of problems that lend themselves to parallel computation and the methods for implementing programs to solve such problems. The aim of the module is to provide a background for parallel and distributed computing as well as practical knowledge of the implementation of computational experiments.

Information hiding 788 (COS 788)

Qualification	Postgraduate
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Module credits	15.00
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Programmes	BScHons Computer Science
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Prerequisites	No prerequisites.
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Contact time	2 lectures per week
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Language of tuition	Module is presented in English
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Department	Computer Science
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Period of presentation	Semester 1 or Semester 2
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Module content

Information hiding is a category of computer security that focuses on embedding information in digital objects. Information, such as digital signatures, are sometimes embedded in objects to indicate ownership or origin – a technology that is called watermarking. Alternatively information is sometimes hidden in digital objects to facilitate invisible or inaudible communication – called steganography. Steganography focuses on the confidentiality of information, while watermarking is used to protect intellectual property. This module covers the techniques and algorithms used in both technologies to embed information in objects with minimal perceptual and audible changes to the objects. The module also provides a brief overview of different multimedia formats, such as image, audio and video, in order to understand their potential and limitations in the field of information hiding. Potential attacks on information hiding systems are also investigated.

Special topics (I) 790 (COS 790)

Qualification	Postgraduate
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Module credits	15.00
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Programmes	BScHons Computer Science
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Prerequisites	No prerequisites.
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Contact time	2 lectures per week
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Language of tuition	Module is presented in English
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Department	Computer Science
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Period of presentation	Semester 1 or Semester 2
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Module content

From time to time, the department presents lectures on special topics within Computer Science. This module will be used to present such special topics.

Special topics (II) 791 (COS 791)

Qualification	Postgraduate
Module credits	15.00
Programmes	BScHons Computer Science
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Computer Science
Period of presentation	Semester 1 or Semester 2

Module content

From time to time, the department presents lectures on special topics within Computer Science. This module will be used to present such special topics.

Big data science elective 801 (COS 801)

Qualification	Postgraduate
Module credits	5.00
Programmes	MIT Big Data Science (Coursework)
Prerequisites	No prerequisites.
Contact time	5 contact hours
Language of tuition	Module is presented in English
Department	Computer Science
Period of presentation	Semester 2

Module content

Example courses, amongst others, may include: Cyber-security, Digital Forensics, Deep Machine Learning, Image and sound analysis, Feature extraction, and Graph Modelling. In addition to study-leader approval, elective course selection may be subject to course pre-requisites, course availability, and internal departmental regulations as decided by the Head of the Department.

Big data science elective 802 (COS 802)

Qualification	Postgraduate
Module credits	5.00
Programmes	MIT Big Data Science (Coursework)
Prerequisites	No prerequisites.
Contact time	5 contact hours

Language of tuition	Module is presented in English
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Department	Computer Science
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Period of presentation	Semester 2
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Module content

Example courses, amongst others, may include: Cyber-security, Digital Forensics, Deep Machine Learning, Image and sound analysis, Feature extraction, and Graph Modelling. In addition to study-leader approval, elective course selection may be subject to course pre-requisites, course availability, and internal departmental regulations as decided by the Head of the Department.

Particle technology 410 (CPA 410)

Qualification	Undergraduate
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Module credits	16.00
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Programmes	BEng Chemical Engineering BEng Chemical Engineering ENGAGE
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Prerequisites	(COP 311)
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Contact time	3 tutorials per week, 4 lectures per week
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Language of tuition	Module is presented in English
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Department	Chemical Engineering
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Period of presentation	Semester 1
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Module content

Humidification and dehumidification of air. Water cooling, drying, crystallisation, ion exchange, particle technology, particle movement in a fluid, sedimentation. Hydrocyclones, flotation, filtration. Centrifuges. Fluidised bed technology. Mixing. Comminution. Pneumatic transport.

Process control 410 (CPB 410)

Qualification	Undergraduate
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Module credits	16.00
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Programmes	BEng Chemical Engineering BEng Chemical Engineering ENGAGE
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Prerequisites	CPN 321 GS
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Contact time	3 tutorials per week, 4 lectures per week
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Language of tuition	Module is presented in English
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Department	Chemical Engineering
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Period of presentation	Semester 1
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Module content

Dynamic properties of equipment, instruments and processes. Mathematical modelling and computer simulation of processes in the time, Laplace and frequency domains. Linearisation and non-linear processes. Stability of control systems. Controller tuning. Methods for process identification. Digital process control. Z-transforms. Use of computers and microprocessors. Introduction to modern control theory: state-space approach. Applied process control. Choice of control instrumentation. Plantwide control strategy. Development of P and IDs.

Continuing practice development 710 (CPD 710)

Qualification	Postgraduate
Module credits	6.00
Programmes	BArchHons BIntArchHons BLArchHons
Prerequisites	No prerequisites.
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Architecture
Period of presentation	Quarter 2

Continuing practice development 720 (CPD 720)

Qualification	Postgraduate
Module credits	6.00
Programmes	BArchHons BIntArchHons BLArchHons
Prerequisites	No prerequisites.
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Architecture
Period of presentation	Quarter 1

Continuing practice development 730 (CPD 730)

Qualification	Postgraduate
Module credits	6.00
Programmes	BArchHons BIntArchHons BLArchHons
Prerequisites	No prerequisites.

Contact time	20 lectures per week
Language of tuition	Module is presented in English
Department	Architecture
Period of presentation	Quarter 4

Continuing practice development 740 (CPD 740)

Qualification	Postgraduate
Module credits	6.00

Programmes	BArchHons BIntArchHons BLArchHons
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Prerequisites	No prerequisites.
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Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Architecture
Period of presentation	Quarter 3

Continuing practice development 810 (CPD 810)

Qualification	Postgraduate
Module credits	15.00

Programmes	MArch (Professional) MIntArch (Professional) MLArch (Professional)
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Prerequisites	No prerequisites.
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Contact time	20 lectures per week
Language of tuition	Module is presented in English
Department	Architecture
Period of presentation	Semester 2

Design project 421 (CPJ 421)

Qualification	Undergraduate
Module credits	24.00

Programmes	BEng Chemical Engineering BEng Chemical Engineering ENGAGE
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Prerequisites	(CPB 410), (CRO 410), BIE 310/BSS 310, CIO 320, CPS 420#, CPR 420#
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Contact time	1 tutorial per week
Language of tuition	Module is presented in English

Department	Chemical Engineering
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Period of presentation	Semester 2
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Module content

Application of chemical engineering principles for the complete design of a chemical plant.

Process dynamics 321 (CPN 321)

Qualification	Undergraduate
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Module credits	16.00
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Programmes	BEng Chemical Engineering BEng Chemical Engineering ENGAGE
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Prerequisites	CIO 310#, CKN 321#
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Contact time	3 tutorials per week, 4 lectures per week
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Language of tuition	Module is presented in English
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Department	Chemical Engineering
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Period of presentation	Semester 2
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Module content

Application of the continuity equations, transport equations and phase relationships to describe time-dependent behaviour of processes. Linearisation and use of transfer functions. Stability analysis, effect of dead time and inverse response. Elements of a control loop. Control principles and mechanisms.

Product design 732 (CPO 732)

Qualification	Postgraduate
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Module credits	32.00
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Programmes	BEngHons Chemical Engineering BScHons Applied Science Chemical Technology
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Prerequisites	No prerequisites.
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Contact time	24 contact hours per semester
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Language of tuition	Module is presented in English
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Department	Chemical Engineering
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Period of presentation	Semester 1
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Polymer processing 732 (CPP 732)

Qualification	Postgraduate
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Module credits	32.00
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Programmes	BEngHons Chemical Engineering BScHons Applied Science Chemical Technology
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Prerequisites	No prerequisites.
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Contact time	32 contact hours per semester
Language of tuition	Module is presented in English
Department	Chemical Engineering
Period of presentation	Semester 1 or Semester 2

Chemical engineering practice 420 (CPR 420)

Qualification	Undergraduate
Module credits	8.00
Programmes	BEng Chemical Engineering BEng Chemical Engineering ENGAGE
Prerequisites	CLB 321, CPJ 421#
Contact time	1 tutorial per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Chemical Engineering
Period of presentation	Semester 2

Module content

Design economics and process evaluation. Cost estimation and time-value of money. Control applications, choice of instrumentation and development of a plantwide control strategy. Development of P&ID's. Safety: Site plan and layout, area classification, hazard and operability analysis (HAZOP). Occupational Safety and Health Act, Engineering Profession of South Africa Act. Requirements to maintain continued competence and to keep abreast of up-to date tools and techniques. ECSA code of conduct, Continuing Professional Development, ECSA outcomes, ECSA process and reasons for registration as PrEng. Displays understanding of the system of professional development. Accepts responsibility for own actions. Displays judgment in decision making during problem solving and design. Limits decision making to area of current competence. Reason about and make judgment on ethical aspects in case study context. Discerns boundaries of competence in problem solving and design. Case studies typical of engineering practice situations in which the graduate is likely to participate.

Process synthesis 410 (CPS 410)

Qualification	Undergraduate
Module credits	8.00
Programmes	BEng Chemical Engineering BEng Chemical Engineering ENGAGE
Prerequisites	CLB 321, CIR 310 GS
Contact time	1 tutorial per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Chemical Engineering
Period of presentation	Semester 1

Module content

Development of new processing plants; Evaluating process alternatives; Developing a process flowsheet using a process synthesis approach. Applying thermodynamic principles to obtain an optimal synthesis route. Applications using computer packages.

Process analysis 420 (CPS 420)

Qualification Undergraduate

Module credits 8.00

Programmes [BEng Chemical Engineering](#)
[BEng Chemical Engineering ENGAGE](#)

Prerequisites CPS 410

Contact time 1 tutorial per week, 2 lectures per week

Language of tuition Module is presented in English

Department Chemical Engineering

Period of presentation Semester 2

Module content

Pinch analysis and exergy analysis. Optimisation techniques. Flowsheet optimisation. Economic evaluation of processes. Applications using computer packages.

Polymer materials science and research 732 (CPW 732)

Qualification Postgraduate

Module credits 32.00

Programmes [BEngHons Chemical Engineering](#)
[BScHons Applied Science Chemical Technology](#)

Prerequisites No prerequisites.

Contact time 32 contact hours per semester

Language of tuition Module is presented in English

Department Chemical Engineering

Period of presentation Semester 1

Practical training 311 (CPY 311)

Qualification Undergraduate

Module credits 16.00

Programmes [BEng Chemical Engineering](#)
[BEng Chemical Engineering ENGAGE](#)

Prerequisites (CIR 211)

Contact time 1 other contact session per week

Language of tuition	Separate classes for Afrikaans and English
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Department	Chemical Engineering
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Period of presentation	Semester 1
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Module content

*Attendance module only

At the end of the second year of study, students in Chemical Engineering undergo at least six weeks of prescribed practical training in the industry. The student must also attend all excursions organised during the year by the department. A satisfactory report on the practical training must be submitted to the Faculty Administration within one week of registration. In exceptional circumstances the prescribed minimum period can be reduced, as approved by the Chairman of the School of Engineering.

Practical training 411 (CPY 411)

Qualification	Undergraduate
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Module credits	16.00
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Programmes	BEng Chemical Engineering BEng Chemical Engineering ENGAGE
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Prerequisites	(CMO 320), CPY 311
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Contact time	1 other contact session per week
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Language of tuition	Separate classes for Afrikaans and English
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Department	Chemical Engineering
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Period of presentation	Semester 1
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Module content

*Attendance module only

At the end of the third year of study, students in chemical engineering undergo at least six weeks of prescribed practical training in the industry. The student must also attend all excursions organised during the year by the department. A satisfactory report on the practical training must be submitted to the department within one week of registration. In exceptional circumstances the prescribed minimum period can be reduced, as approved by the chairman of the School of Engineering.

Bio-reaction engineering 732 (CRH 732)

Qualification	Postgraduate
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Module credits	32.00
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Programmes	BEngHons Chemical Engineering
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Prerequisites	No prerequisites.
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Contact time	32 contact hours per semester
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Language of tuition	Module is presented in English
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Department	Chemical Engineering
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Period of presentation	Semester 1
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Module content

In depth understanding of the important metabolic pathways in microorganisms, black box models for describing stoichiometry of bioreactions, metabolic flux analysis as the basis for metabolic (genetic) engineering, kinetics of microbial conversions and basic bioreactor design.

Reactor design 410 (CRO 410)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Chemical Engineering BEng Chemical Engineering ENGAGE
Prerequisites	CKN 321 GS
Contact time	3 tutorials per week, 4 lectures per week
Language of tuition	Module is presented in English
Department	Chemical Engineering
Period of presentation	Semester 1

Module content

Heterogeneous catalysis: diffusion in reaction for catalyst pores and different catalyst geometries. Inter and intraparticle heat and mass transfer processes. Reactor design: energy and continuity equation for different types of reactor: stirred tank, pipe, radial flow, slurry and fluidised. Modelling of non-ideal flow in reactors.

Research orientation 700 (CRO 700)

Qualification	Postgraduate
Module credits	32.00
Programmes	BEngHons Chemical Engineering
Prerequisites	Registration requires departmental approval.
Contact time	32 contact hours per semester
Language of tuition	Module is presented in English
Department	Chemical Engineering
Period of presentation	Semester 1 and Semester 2

Module content

Design, construction and testing of experimental setup. Initial test experiments, calibrations and modifications. Preliminary results. Experimental plan and schedule for the research dissertation. Detailed predictions on anticipated measurements. Directly relevant literature (core essentials taken from CIR 702).

Reactor design 780 (CRO 780)

Qualification	Postgraduate
Module credits	8.00

Prerequisites	No prerequisites.
Contact time	32 contact hours per semester
Language of tuition	Module is presented in English
Department	Chemical Engineering
Period of presentation	Semester 1

Reactor design 787 (CRO 787)

Qualification	Postgraduate
Module credits	16.00
Prerequisites	No prerequisites.
Contact time	10 lectures per week
Language of tuition	Module is presented in English
Department	Chemical Engineering
Period of presentation	Semester 2

Research project 411 (CSC 411)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Chemical Engineering BEng Chemical Engineering ENGAGE
Prerequisites	CLB 321, CPB 410 # and CRO 410 #
Contact time	1 tutorial per week
Language of tuition	Module is presented in English
Department	Chemical Engineering
Period of presentation	Semester 1

Module content

The execution of a complete literature study and research project on a chosen subject.

Research project 421 (CSC 421)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Chemical Engineering BEng Chemical Engineering ENGAGE
Prerequisites	CSC 411
Contact time	1 tutorial per week
Language of tuition	Module is presented in English

Department	Chemical Engineering
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Period of presentation	Semester 2
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Module content

Interpretation of the research results of CSC 411. The writing of a project report and scientific article.

Separation technology 732 (CSK 732)

Qualification	Postgraduate
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Module credits	32.00
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Programmes	BEngHons Chemical Engineering BScHons Applied Science Chemical Technology
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Prerequisites	No prerequisites.
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Contact time	32 contact hours per semester
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Language of tuition	Module is presented in English
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Department	Chemical Engineering
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Period of presentation	Semester 1
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Process control system research and development 732 (CSP 732)

Qualification	Postgraduate
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Module credits	32.00
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Programmes	BEngHons Chemical Engineering BEngHons Control Engineering
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Prerequisites	No prerequisites.
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Contact time	32 contact hours per semester
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Language of tuition	Module is presented in English
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Department	Chemical Engineering
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Period of presentation	Semester 1
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Specialisation 420 (CSS 420)

Qualification	Undergraduate
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Module credits	16.00
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Programmes	BEng Chemical Engineering BEng Chemical Engineering ENGAGE
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Prerequisites	CPJ 421#
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Contact time	4 lectures per week
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Language of tuition	Module is presented in English
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Department	Chemical Engineering
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Period of presentation	Semester 2
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Module content

A module to be selected from the list of available specialisation topics, including Process Control, Chemical Product Design, Environmental Engineering, Nuclear Engineering, Polymer Processing, Reactor Design, and Water Utilisation Engineering.

Thermodynamics 223 (CTD 223)

Qualification	Undergraduate
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Module credits	16.00
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Programmes	BEng Chemical Engineering BEng Chemical Engineering ENGAGE
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Prerequisites	CIR 211, MPR 212/213, (WTW 258)
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Contact time	3 tutorials per week, 4 lectures per week
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Language of tuition	Module is presented in English
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Department	Chemical Engineering
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Period of presentation	Semester 2
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Module content

Simple applications of the first and second laws of thermodynamics. The concepts of work, heat, enthalpy and entropy. The calculation of internal energy, enthalpy and entropy using the equations of state. Simple heat engine cycles. Refrigeration and gas liquefaction. Process efficiency by means of energy. Introduction to non-ideality in VLE and mixing behaviour.

Dissertation 800 (CVD 800)

Qualification	Postgraduate
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Module credits	180.00
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Programmes	MEng Chemical Engineering MEng Control Engineering MEng Environmental Engineering MEng Water Utilisation Engineering
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Prerequisites	No prerequisites.
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Language of tuition	Module is presented in English
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Department	Chemical Engineering
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Period of presentation	Year
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Dissertation 807 (CVD 807)

Qualification	Postgraduate
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Module credits	180.00
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Programmes	MSc Applied Science Chemical Technology MSc Applied Science Control MSc Applied Science Environmental Technology MSc Applied Science Water Utilisation
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Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Chemical Engineering
Period of presentation	Year

Practical work experience 700 (CWE 700)

Qualification	Postgraduate
Module credits	0.00
Programmes	BScHons Construction Management BScHons Quantity Surveying BScHons Real Estate
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Construction Economics
Period of presentation	Year

Module content

This is a compulsory 240-hour work experience module that requires the submission of a signed logbook to record and confirm the hours worked in the construction industry.

Additive technology 732 (CYM 732)

Qualification	Postgraduate
Module credits	32.00
Programmes	BEngHons Chemical Engineering BScHons Applied Science Chemical Technology
Prerequisites	No prerequisites.
Contact time	32 contact hours per semester
Language of tuition	Module is presented in English
Department	Chemical Engineering
Period of presentation	Semester 1

Design investigation 801 (DIT 801)

Qualification	Postgraduate
Module credits	75.00
Programmes	MArch (Professional)

Prerequisites	No prerequisites.
Contact time	6 seminars per week
Language of tuition	Module is presented in English
Department	Architecture
Period of presentation	Year

Design investigation 802 (DIT 802)

Qualification	Postgraduate
Module credits	75.00
Programmes	MLArch (Professional)
Prerequisites	No prerequisites.
Contact time	6 seminars per week
Language of tuition	Module is presented in English
Department	Architecture
Period of presentation	Year

Design investigation 803 (DIT 803)

Qualification	Postgraduate
Module credits	75.00
Programmes	MIntArch (Professional)
Prerequisites	No prerequisites.
Contact time	6 seminars per week
Language of tuition	Module is presented in English
Department	Architecture
Period of presentation	Year

Mini-dissertation: Design project and discourse 801 (DPD 801)

Qualification	Postgraduate
Module credits	90.00
Programmes	MArch (Professional)
Prerequisites	No prerequisites.
Contact time	6 seminars per week
Language of tuition	Module is presented in English
Department	Architecture
Period of presentation	Year

Mini-dissertation: Design project and discourse 802 (DPD 802)

Qualification	Postgraduate
Module credits	90.00
Programmes	MLArch (Professional)
Prerequisites	No prerequisites.
Contact time	6 seminars per week
Language of tuition	Module is presented in English
Department	Architecture
Period of presentation	Year

Mini-dissertation: Design project and discourse 803 (DPD 803)

Qualification	Postgraduate
Module credits	90.00
Programmes	MIntArch (Professional)
Prerequisites	No prerequisites.
Contact time	6 seminars per week
Language of tuition	Module is presented in English
Department	Architecture
Period of presentation	Year

German: Cultural-professional (1) 113 (DTS 113)

Qualification	Undergraduate
Module credits	12.00
Programmes	BIS Publishing
Service modules	Faculty of Health Sciences
Prerequisites	Grade 12 German
Contact time	1 discussion class per week, 2 lectures per week
Language of tuition	Module is presented in English and German
Department	Ancient and Modern Languages and Cultures
Period of presentation	Semester 1

Module content

Comprehensive review of German grammar; development of reading, writing, speaking and understanding skills; analysis and interpretation of texts.

German: Cultural-professional (2) 123 (DTS 123)

Qualification	Undergraduate
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Module credits	12.00
Programmes	BIS Publishing
Service modules	Faculty of Health Sciences
Prerequisites	DTS 113
Contact time	1 discussion class per week, 2 lectures per week
Language of tuition	Module is presented in English and German
Department	Ancient and Modern Languages and Cultures
Period of presentation	Semester 2

Module content

Continuation of comprehensive review of German; further development of reading, writing, speaking and understanding skills; analysis and interpretation of texts.

German: Intermediate (1) 211 (DTS 211)

Qualification	Undergraduate
Module credits	20.00
Programmes	BIS Publishing
Prerequisites	DTS 104 or DTS 123
Contact time	1 lecture per week, 4 discussion classes per week
Language of tuition	Module is presented in English and German
Department	Ancient and Modern Languages and Cultures
Period of presentation	Semester 1

Module content

This module focuses on the further development of communication skills with special emphasis on the receptive activities of the language, namely listening and reading. Careful attention is given to critical aspects of German grammar. Short fictional and non-fictional texts are used for comprehension as well as for demonstrating cultural aspects of the German-speaking countries. This module complies with the requirements for level B1.1 set by the "Common European Framework of Reference for Languages".

German: Intermediate (2) 221 (DTS 221)

Qualification	Undergraduate
Module credits	20.00
Programmes	BIS Publishing
Prerequisites	DTS 211
Contact time	1 lecture per week, 4 discussion classes per week
Language of tuition	Module is presented in English and German
Department	Ancient and Modern Languages and Cultures

Period of presentation	Semester 2
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Module content

This module continues with the development of communicative skills of the language. Special attention is given to the comprehension of non-fictional and literary written texts, spoken and audio-visual inputs, as well as the application of knowledge of German grammar in oral and written production. This module complies with the requirements for level B1.2 set by the “Common European Framework of Reference for Languages”.

German: Cultural-professional (7) 361 (DTS 361)

Qualification	Undergraduate
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Module credits	15.00
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Programmes	BIS Publishing
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Prerequisites	DTS 221 or DTS 261, 262, 263 and 264
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Contact time	2 discussion classes per week
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Language of tuition	Module is presented in German
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Department	Ancient and Modern Languages and Cultures
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Period of presentation	Semester 1
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Module content

Introduction to German linguistics. This module complies with the requirements for level B2.1 set by the “Common European Framework of Reference for Languages”.

German: Cultural-professional (8) 362 (DTS 362)

Qualification	Undergraduate
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Module credits	15.00
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Programmes	BIS Publishing
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Prerequisites	DTS 221 or DTS 261, 262, 263 and 264
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Contact time	1 lecture per week, 2 discussion classes per week
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Language of tuition	Module is presented in German
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Department	Ancient and Modern Languages and Cultures
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Period of presentation	Semester 1
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Module content

Analysis, interpretation and appropriation of relevant texts from different disciplines. This module complies with the requirements for level B2.1 set by the “Common European Framework of Reference for Languages”.

German: Cultural-professional (9) 363 (DTS 363)

Qualification	Undergraduate
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Module credits	15.00
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Programmes	BIS Publishing
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Prerequisites	DTS 361
Contact time	2 discussion classes per week
Language of tuition	Module is presented in German
Department	Ancient and Modern Languages and Cultures
Period of presentation	Semester 2

Module content

Principles of textual grammar of the German language. This module complies with the requirements for level B2.2 set by the “Common European Framework of Reference for Languages”.

German: Cultural-professional (10) 364 (DTS 364)

Qualification	Undergraduate
Module credits	15.00
Programmes	BIS Publishing
Prerequisites	DTS 362
Contact time	1 lecture per week, 2 discussion classes per week
Language of tuition	Module is presented in German
Department	Ancient and Modern Languages and Cultures
Period of presentation	Semester 2

Module content

Analysis, interpretation and appropriation of literary texts in cultural-historical perspective. This module complies with the requirements for level B2.2 set by the “Common European Framework of Reference for Languages”.

Electrical drives 410 (EAD 410)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Electrical Engineering BEng Electrical Engineering ENGAGE
Prerequisites	ELX 311GS and EDF 320 GS
Contact time	1 practical per week, 1 tutorial per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Semester 1

Module content

Single and three-phase DC-AC invertors, PWM, 4-quadrant conversion, DC and AC variable speed drives and high frequency transformer design.

Advanced classical optics 732 (EAD 732)

Qualification	Postgraduate
Module credits	32.00
Prerequisites	No prerequisites.
Contact time	32 contact hours per semester
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Semester 1

Module content

Propagation and diffraction, linear optical systems theory, coherence, fundamentals of imaging, including MTF and basic aberration theory, some applications including: diffraction gratings, holography, gradient index media and periodic media.

Intelligent systems 320 (EAI 320)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Computer Engineering BEng Computer Engineering ENGAGE
Prerequisites	WTW 258 GS
Contact time	1 practical per week, 1 tutorial per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Semester 1

Module content

Practical application of neural networks, fuzzy logic, genetic algorithms and expert systems. Introduction to pattern recognition, optimization and problemsolving using intelligent systems techniques.

Intelligent systems 732 (EAI 732)

Qualification	Postgraduate
Module credits	32.00
Programmes	BEngHons Computer Engineering BEngHons Electronic Engineering
Prerequisites	No prerequisites.
Contact time	10 lectures per week
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering

Period of presentation	Semester 1
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Module content

This module provides the theoretical background necessary to understand, research and develop real-world software and hardware systems that incorporate and exhibit intelligent behaviour. The module incorporates advanced theory from fields such as Artificial Intelligence, Computational Intelligence, Machine Learning, Pattern Recognition and Signal Processing. Core topics of the module include: Bayesian Theory, Neural Networks, Kernel Methods, Graphic Models, and Numerical Bayesian Methods.

Advanced topics in intelligent systems 733 (EAI 733)

Qualification	Postgraduate
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Module credits	32.00
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Programmes	BEngHons Computer Engineering BEngHons Electronic Engineering
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Prerequisites	EAI 732
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Contact time	10 lectures per week
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Language of tuition	Module is presented in English
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Department	Electrical, Electronic and Computer Engineering
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Period of presentation	Semester 1 or Semester 2
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Module content

The aim of the module is to augment the general background provided by the EAI 732 module with the specific theoretical background required for MEng. The module will, depending on the intended research field of the student, incorporate advanced theory from fields such as: Digital Image Processing, Computer and Robotic Vision, Probabilistic Robotics, Data Fusion, Hardware and Software Parallel Processing, Real-Time and Reactive Systems.

Computer engineering: Architecture and systems 410 (EAS 410)

Qualification	Undergraduate
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Module credits	16.00
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Programmes	BEng Computer Engineering BEng Computer Engineering ENGAGE
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Prerequisites	EMK 310 GS
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Contact time	1 practical per week, 1 tutorial per week, 3 lectures per week
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Language of tuition	Module is presented in English
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Department	Electrical, Electronic and Computer Engineering
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Period of presentation	Semester 1
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Module content

This module aims to provide a strong foundation for allowing students to understand modern computer architectures and systems. Microarchitectures and instruction set architectures (ISAs) will be studied in detail, as well as computer memory types and their organisation. The study will also cover performance acceleration techniques such as caching and pipelining.

Topics relating to parallel processing will be studied, including instruction level parallel processing (SIMD), multi-threading and multi-core processors as well as their synchronisation. Specialised architectures and techniques used in embedded processors (such as those found in smartphones) will be explored. The module also provides an overview of advanced computer communication buses, memory and storage systems prevalent in enterprise class computing (data centres), including topics such as: network-attached storage NAS, virtualisation, clusters, grid computing and cloud computing. Practicals will demonstrate various elements of computer architectures using VHDL.

Control systems 320 (EBB 320)

Qualification	Undergraduate
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Module credits	16.00
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Programmes	BEng Computer Engineering BEng Computer Engineering ENGAGE BEng Electrical Engineering BEng Electrical Engineering ENGAGE BEng Electronic Engineering BEng Electronic Engineering ENGAGE
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Prerequisites	ELI 220 GS
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Contact time	1 practical per week, 1 tutorial per week, 3 lectures per week
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Language of tuition	Module is presented in English
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Department	Electrical, Electronic and Computer Engineering
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Period of presentation	Semester 2
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Module content

Modelling and simulation of physical systems. Block and signal flow diagrams. State variable formulation. Time and frequency domain analysis. Stability and sensitivity. Design methods, cascade (eg. PID) and feedback controllers.

Biosignals and systems 732 (EBB 732)

Qualification	Postgraduate
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Module credits	32.00
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Programmes	BEngHons Bioengineering BEngHons Electronic Engineering
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Prerequisites	Bio-engineering: Bioelectricity and Electronics EBE 732
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Contact time	32 contact hours per semester
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Language of tuition	Module is presented in English
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Department	Electrical, Electronic and Computer Engineering
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Period of presentation	Semester 2
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Module content

The objective of the module is to teach the engineering student how to apply engineering tools to the analysis of biological systems for the purpose of (i) developing understanding of the anatomy and physiology of specific biological systems from an engineering perspective, (ii) deriving appropriate mathematical descriptions of biological systems, and (iii) engineering applicable therapeutic interventions. We will expand on the single nerve fibre studies considered in bioelectricity and electronics: where the latter examined the biophysics of single excitable cells (and electrostimulation thereof), this module will develop it into an analysis of the characteristics of populations of neurons. We will systematically develop a systems-level perspective, working our way through the hierarchical organisation of neural encoding and computation. Furthermore, we will discuss how to measure characteristics and parameters of a particular system (the auditory system) and how to glean information about lower hierarchical levels from these measurements. This is a course in modelling and measurement, using tools from signal processing, control systems, dynamics, probability theory, systems engineering and psychoacoustics.

Control practice 780 (EBB 780)

Qualification	Postgraduate
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Module credits	32.00
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Prerequisites	No prerequisites.
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Contact time	32 contact hours per semester
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Language of tuition	Module is presented in English
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Department	Electrical, Electronic and Computer Engineering
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Period of presentation	Semester 2
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Bioelectricity and electronics 732 (EBE 732)

Qualification	Postgraduate
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Module credits	32.00
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Programmes	BEngHons Bioengineering BEngHons Electronic Engineering
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Prerequisites	No prerequisites.
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Contact time	32 contact hours per semester
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Language of tuition	Module is presented in English
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Department	Electrical, Electronic and Computer Engineering
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Period of presentation	Semester 1
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Module content

This module focuses on electrophysiology, using a quantitative approach. Topics covered in the first part of the module are: electrical properties of the nerve cell membrane, action potentials and the Hodgkin-Huxley model, cable theory, the neuromuscular junction, and extracellular fields. The second part of the module builds on this background to discuss the theory and practice of electrical nerve stimulation. Applications of the theoretical work is discussed, including functional electrical stimulation (e.g. electrostimulation used for standing and walking in paraplegics), and cochlear implants for the deaf.

Bioelectromagnetism and modelling 732 (EBI 732)

Qualification	Postgraduate
Module credits	32.00
Programmes	BEngHons Bioengineering BEngHons Electronic Engineering
Prerequisites	Undergraduate Electromagnetism EMZ 320 or equivalent
Contact time	32 contact hours per semester
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Semester 1

Module content

The course provides an introduction to modelling of bioelectromagnetic systems using numerical methods. It focuses on the study of the interaction of electromagnetic fields with biological systems and application of this knowledge in the modelling of biological volume conduction problems. The finite element technique is used to analyse volume conduction problems. Students are introduced to an industry standard finite element software package, ANSYS, that is used to complete the practical component of the course.

Property marketing 710 (EBM 710)

Qualification	Postgraduate
Module credits	6.00
Programmes	BScHons Real Estate Retail Property
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Construction Economics
Period of presentation	Semester 1

Module content

Marketing of professional services in the property industry. Marketing of large scale property developments. Marketing of specialized property services, i.e. shopping centre activities, hotels and hospitality properties, etc. Marketing of equity capital structures.

Market and location studies 720 (EBM 720)

Qualification	Postgraduate
Module credits	6.00
Programmes	BScHons Real Estate Retail Property
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Construction Economics
Period of presentation	Semester 2

Module content

Market- and marketability analysis, the influence of location on the marketability and cost of ownership of property, different location models.

Market and location studies of shopping centres 721 (EBM 721)

Qualification	Postgraduate
Module credits	6.00
Prerequisites	No prerequisites.
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Construction Economics
Period of presentation	Semester 2

Module content

Market and marketability analysis of shopping centres, the influence of location on the marketability and cost of ownership of retail property, different location models of retail property.

Electricity and electronics 111 (EBN 111)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Chemical Engineering ENGAGE BEng Civil Engineering ENGAGE BEng Computer Engineering BEng Computer Engineering ENGAGE BEng Electrical Engineering ENGAGE BEng Electronic Engineering ENGAGE BEng Industrial Engineering BEng Industrial Engineering ENGAGE BEng Mechanical Engineering BEng Mechanical Engineering ENGAGE BEng Metallurgical Engineering ENGAGE
Prerequisites	No prerequisites.

Contact time	1 practical per week, 1 tutorial per week, 3 lectures per week
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Language of tuition	Module is presented in English
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Department	Electrical, Electronic and Computer Engineering
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Period of presentation	Semester 1
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Module content

Electrical quantities, units, definitions, conventions. Electrical symbols, ideal and practical current and voltage sources, controlled sources. Ohm's law in resistive circuits, Kirchoff's current and voltage laws, resistors in series and parallel circuits, voltage and current division, mesh current and node voltage methods. Circuit theorems: Linearity, superposition, Thevenin and Norton equivalent circuits, sources transformation, power calculation, maximum power transfer. Energy storage elements: current, voltage, power and energy in inductors and capacitors, inductors and capacitors in series and parallel. Ideal operational amplifiers and applications: inverting and noninverting amplifiers, summing amplifiers, current sources, integrators.

Electricity and electronics 122 (EBN 122)

Qualification	Undergraduate
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Module credits	16.00
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Programmes

[BEng Chemical Engineering](#)
[BEng Civil Engineering](#)
[BEng Electrical Engineering](#)
[BEng Electronic Engineering](#)
[BEng Metallurgical Engineering](#)
[BEng Mining Engineering](#)
[BEng Mining Engineering ENGAGE](#)

Prerequisites	No prerequisites.
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Contact time	1 practical per week, 1 tutorial per week, 3 lectures per week
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Language of tuition	Module is presented in English
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Department	Electrical, Electronic and Computer Engineering
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Period of presentation	Semester 2
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Module content

Electrical quantities, units, definitions, conventions. Electrical symbols, ideal and practical current and voltage sources, controlled sources. Ohm's law in resistive circuits, Kirchoff's current and voltage laws, resistors in series and parallel circuits, voltage and current division, mesh current and node voltage methods. Circuit theorems: linearity, superposition, Thevenin and Norton equivalent circuits, sources transformation, power calculation, maximum power transfer. Energy storage elements: current, voltage, power and energy in inductors and capacitors, inductors and capacitors in series and parallel. Ideal operational amplifiers and applications: inverting and noninverting amplifiers, summing amplifiers, current sources, integrators.

Non-linear control 780 (EBN 780)

Qualification	Postgraduate
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Module credits	32.00
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Prerequisites	No prerequisites.
Contact time	32 contact hours per semester
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Semester 1

Optimal control 780 (EBO 780)

Qualification	Postgraduate
Module credits	32.00
Programmes	BEngHons Electrical Engineering BEngHons Electronic Engineering
Prerequisites	Introductory control course such as EBB 320
Contact time	32 contact hours per semester
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Semester 1

Module content

Optimal control of dynamic systems: continuous time systems, the Euler Lagrange equations, minimum time problems, the Pontryagin maximum principle; feasible control: computation of control input strategies for nonlinear systems such that the given control specifications are satisfied; feedback control of dynamic systems: dynamic programming for continuous time and discrete time nonlinear systems; applications in manufacturing systems; parametrisations of nonlinear/intelligent controller structures and applications of feasible control; linear systems: linear optimal control, linear optimal observers; application of feasible control in the computation of linear optimal output feedback controllers such that the design specifications are satisfied including: robustness against parameter variations, disturbance rejection, command following, frequency domain specifications.

Facilities management 710 (EBS 710)

Qualification	Postgraduate
Module credits	6.00
Programmes	BScHons Real Estate Retail Property
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Construction Economics
Period of presentation	Semester 1 or Semester 2

Module content

Management of different types of facilities and portfolios of assets. Principles of outsourcing and the outsourcing decision. Contractual relationships in facilities- and asset management.

Property management 801 (EBS 801)

Qualification	Postgraduate
Module credits	20.00
Programmes	MSc Real Estate (Coursework)
Prerequisites	No prerequisites.
Contact time	40 contact hours per semester
Language of tuition	Module is presented in English
Department	Construction Economics
Period of presentation	Year

Shopping centre management 802 (EBS 802)

Qualification	Postgraduate
Module credits	20.00
Programmes	MSc Real Estate Retail Property (Coursework)
Prerequisites	No prerequisites.
Contact time	10 lectures per week
Language of tuition	Module is presented in English
Department	Construction Economics
Period of presentation	Semester 2

Module content

Principles of property management, leasing, management of shopping centres, risk management, financial management, internal management, marketing of management services.

Automation 410 (EBT 410)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Electrical Engineering BEng Electrical Engineering ENGAGE BEng Electronic Engineering BEng Electronic Engineering ENGAGE
Prerequisites	EBB 320 GS
Contact time	1 practical per week, 1 tutorial per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Semester 1

Module content

Plant automation issues. The steps taken to establish controllers for industrial processes. Static and dynamic properties of sensors and actuators. Obtaining models from process data. Plant automation platforms. Model-based PID and internal model control. Tuning and troubleshoot control loops. Unconstrained single-input-single-output model predictive control. Economic evaluation of automation systems.

Wireless telephony 710 (ECW 710)

Qualification	Postgraduate
Module credits	32.00
Prerequisites	No prerequisites.
Contact time	32 contact hours per semester
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Semester 1

Module content

Semester: Year course through CE@UP.
The Centre for Radio and Digital Communications (CRDC), within the Department of Electrical, Electronic and Computer engineering, University of Pretoria in collaboration with Motorola has developed a unique Certificate Course in Wireless Telephony (CCWT). With the emergence of 2.5G and 3G technologies and the convergence between IT and Cellular technologies, training engineers for these developments is crucial. This programme offers the person with certain common telecommunication principles and training in fundamental mobile principles to a specific system generation. The practical/laboratory component attempts to firmly embed these “cutting edge” wireless communications learning outcomes.

Digital communication 310 (EDC 310)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Computer Engineering BEng Computer Engineering ENGAGE
Prerequisites	ELI 220 GS
Contact time	1 practical per week, 1 tutorial per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Semester 2

Module content

Basic Signals Theory, Transform theory (Fourier, Laplace and Z-transform) and Linear Systems. Overview of stochastic processes: Stationarity and ergodicity. Noise and channel models. Transmission effects. Definition of information and coding of analog information sources. Shannon's Channel Capacity Theorem. Introduction to channel (error) detection and correction coding: Block and Convolutional coding. Maximum-likelihood sequence decoding: The Viterbi algorithm. Analysis of digital modulation techniques in AWGN. Optimal Receiver design. Nyquist and Partial-Response systems. Power Spectral Density (PSD) of random data signals. Digital Transmission through band-limited channels: ISI, Nyquist criteria and equalizers. Data communication standards and protocols. The focus will be on applications in the computer and network environments.

Power electronics 320 (EDF 320)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Electrical Engineering BEng Electrical Engineering ENGAGE
Prerequisites	ELX 311 GS, ELI 220 GS
Contact time	1 practical per week, 1 tutorial per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Semester 2

Module content

Semiconductor components: Power diodes, silicon-controlled-rectifiers, bipolar transistors, power mosfets, IGBTs, emerging devices. Ancillary issues: Heat sinks, snubbers, gate drive circuits. Converter topologies: AC-DC converters, DC-DC converters; Applications: Sizing of converter components, isolated high-frequency power supplies.

Property valuation 200 (EDW 200)

Qualification	Undergraduate
Module credits	12.00
Prerequisites	EKN 110/120, EWS 110/120
Language of tuition	Module is presented in English
Department	Construction Economics
Period of presentation	Year

Module content

Property economics and -finance, welfare and economic efficiency: economic efficiency through the price system. Real property: characteristics and functions of the real property market; pricing of land and resources. Development: the development process; timing and rate of development; finance for development; redevelopment; public sector development; economics of planning controls; the construction industry. Urban land use: land use and land values; pattern of urban land use; growth of urban areas; quality of urban environment; housing; regional policy. The government and land resources: impact of government economic policy on land resources; theory of urban public finance; taxation and land resources; recent developments.

Property valuation 300 (EDW 300)

Qualification	Undergraduate
Module credits	24.00
Programmes	BSc Real Estate
Prerequisites	EWS 210, EWS 220
Contact time	4 lectures per week
Language of tuition	Module is presented in English
Department	Construction Economics
Period of presentation	Year

Module content

This course aims to develop an understanding of the Valuation Profession and includes concepts of value, classification of value and accuracy of valuations, the Surveyor-General; the Registrar of Deeds; records of the valuer. Factors affecting the value of different types of properties; appreciation and depreciation, different approaches to valuation, the value of improvement, the valuation report. An introduction to the statutes and ordinances (relevant sections) affecting valuation including the Property Valuers Profession Act. Case law relating to the valuation of fixed property; property valuation, highest and best use of property, influence of the “wrong” development on market value; influences of leases on values; leases and rentals; theory of the income, residual, cost and accounts methods of valuation

Property valuation 700 (EDW 700)

Qualification	Postgraduate
Module credits	12.00
Programmes	BScHons Real Estate Retail Property
Prerequisites	No prerequisites.
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Construction Economics
Period of presentation	Year

Module content

Valuation of income-producing properties, commercial properties, lease agreements, land with development potential, mass valuation techniques and jurisprudence regarding property valuation.

Property valuation 702 (EDW 702)

Qualification	Postgraduate
Module credits	20.00
Programmes	BScHons Real Estate
Prerequisites	No prerequisites.
Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	Construction Economics
Period of presentation	Year

Module content

Valuation of income-producing properties, valuation of leasehold interests, valuation for insurance purposes, land with development potential, mass valuations and the valuation report. Expropriation: the legislation; the process; compensation; methods of valuation. Influence of re-zoning on value; valuation of farmland; usually non-negotiable properties; large shopping centres; air space; interest in time-share; leasehold interests; retirement villages; mining rights. Valuation of properties classified as “special” in terms of function, design, construction, or location: market/non-market properties; market and marketability analysis, the influence of location on the marketability and cost of ownership of property, different location modules. Compiling and writing a valuation report.

Property valuation 801 (EDW 801)

Qualification	Postgraduate
Module credits	20.00
Programmes	MSc Real Estate Retail Property (Coursework) MSc Real Estate (Coursework)
Prerequisites	No prerequisites.
Contact time	40 contact hours per semester
Language of tuition	Module is presented in English
Department	Construction Economics
Period of presentation	Year

Property valuation 802 (EDW 802)

Qualification	Postgraduate
Module credits	20.00

Programmes	MSc Real Estate Retail Property (Coursework) MSc Real Estate (Coursework)
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Prerequisites	No prerequisites.
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Contact time	40 contact hours per semester
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Language of tuition	Module is presented in English
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Department	Construction Economics
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Period of presentation	Year
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Power electronics 780 (EED 780)

Qualification	Postgraduate
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Module credits	32.00
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Programmes	BEngHons Electrical Engineering
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Prerequisites	Undergraduate level Power electronics
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Contact time	32 contact hours per semester
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Language of tuition	Module is presented in English
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Department	Electrical, Electronic and Computer Engineering
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Period of presentation	Semester 1 or Semester 2
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Module content

Power semiconductors - basic structure, I-V characteristic physics of device operation, switching characteristics, SOA; passive components; converter topologies - AC-DC rectifiers, DC-DC converters, DC-AC inverters, AC-AC converters and resonant converters; Dynamics and control - state space models, feedback control design; Ancillary issues - gate and base drives, snubber circuits and clamps, thermal modelling and heatsinking; Applications - electric utility applications, isolated switch-mode power supplies, optimising of the utility interface with power electronic systems.

Electro-optics 732 (EEO 732)

Qualification	Postgraduate
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Module credits	32.00
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Prerequisites	Telecommunications ETK 320 and Microwaves and antennas EMZ 320 or BEng (Electronic Engineering)
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Contact time	32 contact hours per semester
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Language of tuition	Module is presented in English
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Department	Electrical, Electronic and Computer Engineering
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Period of presentation	Semester 1 or Semester 2
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Module content

The module covers the different parts of photonic systems, such as an optical telecommunication system. The contents include: laser sources (laser principles, semiconductor lasers), modulators (electro-optic, magneto-optic, acousto-optic), media (free space propagation, Gaussian beams, optical fibre) and detectors (photo-conductive, photo-voltaic).

Dissertation 891 (EER 891)

Qualification	Postgraduate
Module credits	180.00
Programmes	MSc Applied Science Electrical, Electronic and Computer Engineering
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Year

Research project 424 (EES 424)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Electronic Engineering BEng Electronic Engineering ENGAGE
Prerequisites	ERS 220
Contact time	1 tutorial per week, 2 lectures per week, 2 practicals per week
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Semester 2

Module content

Specific niche areas from electronic engineering are addressed within the context of a research project. The student should be able to demonstrate competence in designing and conducting investigations and experiments; to analyse the results; to select and use appropriate engineering tools and software; to interpret and derive information from the data; to draw conclusions based on evidence and to communicate the purpose, process and outcomes in a report.

Energy management 732 (EES 732)

Qualification	Postgraduate
Module credits	32.00
Programmes	BEngHons Electrical Engineering BEngHons Electronic Engineering
Prerequisites	No prerequisites.

Contact time	32 contact hours per semester
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Semester 2

Module content

Energy management theory, energy policy and strategic planning, load factor, diversity factor, load profiles, disaggregated load profiles, load duration plots, scatter plots, co-incident maximum demand, after-diversity maximum demand, seasonal swing, energy auditing, electricity pricing theory, electricity tariffs, energy norms, energy process modelling, demand-side management.

Power distribution engineering 732 (EEV 732)

Qualification	Postgraduate
Module credits	32.00
Programmes	BEngHons Electrical Engineering
Prerequisites	No prerequisites.
Contact time	32 contact hours per semester
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Semester 1

Module content

Utility source, medium voltage distribution, balanced and unbalanced fault conditions and selection of protective equipment: First cycle fault current calculations, contact parting symmetrical current calculations, power circuit breaker selection. Shunt capacitors: Selection, transients. Motors and motor starting, power quality issues: dips, harmonics, unbalance and flicker.

Dissertation: Micro-electronic engineering 890 (EEY 890)

Qualification	Postgraduate
Module credits	180.00
Programmes	MEng Microelectronic Engineering
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Year

Introduction to tourism 110 (EFK 110)

Qualification	Undergraduate
Module credits	12.00

Programmes	BIS Information Science
Service modules	Faculty of Education
Prerequisites	No prerequisites.
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Historical and Heritage Studies
Period of presentation	Semester 1

Module content

Overview of the origin and nature of tourism development of South African cultural, natural and adventure tourist destinations.

Heritage tourism management 120 (EFK 120)

Qualification	Undergraduate
Module credits	12.00
Programmes	BIS Information Science
Service modules	Faculty of Education
Prerequisites	No prerequisites.
Contact time	1 tutorial per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Historical and Heritage Studies
Period of presentation	Semester 2

Module content

An introductory exploration of the relationship between heritage conservation and tourism.

Optical communications 732 (EFO 732)

Qualification	Postgraduate
Module credits	32.00
Prerequisites	No prerequisites.
Contact time	32 contact hours per semester
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Semester 1

Module content

This course presents optical networks from a practical perspective. Strong emphasis is placed on contemporary topics such as fibre theory, components, transmission systems and networks. Operational matters such as survivability, management and deployment considerations are also addressed. A substantial practical component will include optical time-domain reflectometry and familiarisation.

Interferometry 716 (EFR 716)

Qualification	Postgraduate
Module credits	16.00
Prerequisites	No prerequisites.
Contact time	16 contact hours per semester
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Semester 1

Module content

Credits: 16 (must be combined with Introduction to the science of measurement to form a 32 credit module)

Theory: Michelson interferometer, Mach-Zehnder interferometer, Shack-Hartmann interferometer, Fabry-Perot interferometer, introduction to polarisation interferometry, introduction to interference microscopy, introduction to optical thin films.

Practical: alignment of optical flats, evaluation of optical surfaces, interpretation of interferograms obtained from a Fizeau interferometer, interpretation of Newton fringes, application of a wedge interferometer to determine the thickness of a thin film.

Renewable energy 732 (EGH 732)

Qualification	Postgraduate
Module credits	32.00
Programmes	BEngHons Electrical Engineering
Prerequisites	No prerequisites.
Contact time	32 contact hours per semester
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Semester 1 or Semester 2

Module content

This course will cover various renewable energy technologies including Wind, Solar Photovoltaic systems, Distributed generation and Hybrid power system.

e-Business and network security 410 (EHN 410)

Qualification	Undergraduate
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Module credits	16.00
Programmes	BEng Computer Engineering BEng Computer Engineering ENGAGE
Prerequisites	No prerequisites.
Contact time	1 practical per week, 1 tutorial per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Semester 1

Module content

Commerce via the Internet, electronic payment systems, virtual organisations and electronic business. Introduction to data security, system security, network security, user considerations, firewalls, encryption, access control and social engineering.

Dissertation: Bioengineering 890 (EIB 890)

Qualification	Postgraduate
Module credits	180.00
Programmes	MEng Bioengineering
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Year

Thesis: Biosystems 990 (EIC 990)

Qualification	Postgraduate
Module credits	360.00
Programmes	PhD Biosystems
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Year

Introduction to research 732 (EIN 732)

Qualification	Postgraduate
Module credits	32.00

Programmes	BEngHons Bioengineering BEngHons Computer Engineering BEngHons Electrical Engineering BEngHons Electronic Engineering BEngHons Microelectronic Engineering
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Prerequisites	No prerequisites.
Contact time	16 contact hours per semester
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Semester 1 or Semester 2

Module content

*This is a compulsory module.

The aim of this module is to teach students to critically evaluate research literature, including conference papers and journal articles, in order to determine the current state of knowledge in a particular specialist area. It will also provide students with the principles of research to enable them to conduct research and prepare an original project in their particular specialist area.

Dissertation: Electronic engineering 890 (EIN 890)

Qualification	Postgraduate
Module credits	180.00
Programmes	MEng Electronic Engineering
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Year

Thesis: Electronic engineering 990 (EIN 990)

Qualification	Postgraduate
Module credits	360.00
Programmes	PhD Electronic Engineering
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Year

Thesis: Electronics 991 (EIN 991)

Qualification	Postgraduate
Module credits	360.00

Programmes	PhD Electronics
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Year

Electrical engineering 211 (EIR 211)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Computer Engineering BEng Computer Engineering ENGAGE BEng Electrical Engineering BEng Electrical Engineering ENGAGE BEng Electronic Engineering BEng Electronic Engineering ENGAGE
Prerequisites	EBN 111 or EBN 122 and WTW 161/164
Contact time	1 practical per week, 1 tutorial per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Semester 1

Module content

Transient response phenomena in RC, RL and RLC circuits: Natural response and step response. Alternating current (AC) circuits: Phasors, impedances, and power in AC circuits. The application of Ohm's law, Kirchoff's circuit theorems, matrix methods and Thevenin and Norton equivalents to sinusoidal steady-state analysis. Three-phase circuits: Balanced three-phase circuits, star/delta configurations, and three-phase power transfer calculations. Magnetically coupled circuits: Mutual inductance, coupling factor, transformers, ideal transformers and autotransformers. Application of circuit theory to an induction machine: basic principles of induction machines, equivalent circuit and analysis thereof, calculation of power and torque through application of Thevenin's theorem. Synoptic introduction to other types of machines.

Electrical engineering 221 (EIR 221)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Chemical Engineering BEng Chemical Engineering ENGAGE BEng Mechanical Engineering BEng Mechanical Engineering ENGAGE BEng Metallurgical Engineering BEng Metallurgical Engineering ENGAGE
Prerequisites	EBN 111 or EBN 122 and WTW 161/164

Contact time	1 practical per week, 1 tutorial per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Semester 2

Module content

Transient response phenomena in RC, RL and RLC circuits: Natural response and step response. Alternating current (AC) circuits: Phasors, impedances, and power in AC circuits. The application of Ohm's law, Kirchoff's circuit theorems, matrix methods, and Thevenin and Norton equivalents to sinusoidal steady-state analysis. Three-phase circuits: Balanced three-phase circuits, star/delta configurations, and three-phase power transfer calculations. Magnetically coupled circuits: Mutual inductance, coupling factor, transformers, ideal transformers and autotransformers. Application of circuit theory to induction motors: basic principles of induction motors, equivalent circuit and analysis thereof, calculation of power and torque through application of Thevenin's theorem. Synoptic introduction to other types of motors.

Dissertation: Electrical engineering 890 (EIR 890)

Qualification	Postgraduate
Module credits	180.00
Programmes	MEng Electrical Engineering
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Year

Thesis: Electrical engineering 990 (EIR 990)

Qualification	Postgraduate
Module credits	360.00
Programmes	PhD Electrical Engineering
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Year

Thesis: Electrical 991 (EIR 991)

Qualification	Postgraduate
Module credits	360.00
Programmes	PhD Electric
Prerequisites	No prerequisites.

Contact time	10 lectures per week
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Year

Introduction to the science of measurement 716 (EIS 716)

Qualification	Postgraduate
Module credits	16.00
Prerequisites	No prerequisites.
Contact time	16 contact hours per semester
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Semester 1

Module content

Credits: 16 (must be combined with another 16 credit Laboratory in photonics module to form a 32 credit module)

Theory: Introduction to metrology, international equivalence of units of measurement, realisation of the SI units, principles of measurement, total quality management, data analysis and calculation of uncertainty of measurement. Practical: calibration of luminance and illuminance meters, calibration of an oscillator for frequency, calibration of a thermocouple and digital readout by comparison with an industrial platinum resistance thermometer, characterisation and composition of thin films, national measurement standards of length/mass/electrical current.

Information technology practice 121 (EIW 121)

Qualification	Undergraduate
Module credits	8.00
Programmes	BEng Computer Engineering BEng Computer Engineering ENGAGE
Prerequisites	No prerequisites.
Contact time	2 weeks
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Year

Module content

This module is offered during the recess period at the end of the first year of study. In this module students receive practical training in computers and computer networks. Students will be informed by the Department if, for practical reasons, the module needs to be offered in a different time slot.

Information technology practice 221 (EIW 221)

Qualification	Undergraduate
Module credits	8.00
Programmes	BEng Computer Engineering BEng Computer Engineering ENGAGE
Prerequisites	EIW 121
Contact time	2 weeks
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Year

Module content

This module is offered during the recess period at the end of the second year of study. In this module students receive practical training in computers and computer networks. Students will be informed by the Department if, for practical reasons, the module needs to be offered in a different time slot.

Information technology practice 320 (EIW 320)

Qualification	Undergraduate
Module credits	8.00
Programmes	BEng Computer Engineering BEng Computer Engineering ENGAGE
Prerequisites	EIW 221
Contact time	2 weeks
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Year

Module content

This module is offered during the recess period at the end of the third year of study. In this module students receive practical training in computers and computer networks. Students will be informed by the Department if, for practical reasons, the module needs to be offered in a different time slot.

Professional and technical communication 210 (EJJ 210)

Qualification	Undergraduate
Module credits	8.00

Programmes	BEng Computer Engineering
	BEng Computer Engineering ENGAGE
	BEng Electrical Engineering
	BEng Electrical Engineering ENGAGE
	BEng Electronic Engineering
	BEng Electronic Engineering ENGAGE

Prerequisites	No prerequisites.
Contact time	2 lectures per week, 2 tutorials per week
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Semester 1

Module content

Communicate effectively, both orally and in writing, with engineering audiences and the community at large. Written communication as evidenced by: uses appropriate structure, use of modern or electronic communication methods; style and language for purpose and audience; uses effective graphical support; applies methods of providing information for use by others involved in engineering activity; meets the requirements of the target audience. Effective oral communication as evidenced by appropriate structure, style and language; appropriate visual materials; delivers fluently; meets the requirements of the intended audience. Audiences range from engineering peers, management and lay persons, using appropriate academic or professional discourse. Typed reports range from short (300-1 000 word plus tables diagrams) to long (10 000-15 000 words plus tables, diagrams, references and appendices), covering material at exit level. Methods of providing information include the conventional methods of the discipline, for example engineering drawings, as well as subject-specific methods.

Power network stability 732 (EKE 732)

Qualification	Postgraduate
Module credits	32.00
Prerequisites	No prerequisites.
Contact time	32 contact hours per semester
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Semester 2

Power system components 320 (EKK 320)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Electrical Engineering BEng Electrical Engineering ENGAGE
Prerequisites	EIR 211, 221 GS

Contact time	1 practical per week, 1 tutorial per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Semester 2

Module content

Single and three-phase basic concepts, Transformers: the ideal transformer, equivalent circuit, single and three-phase transformers, auto-transformers, tap changing transformers. Synchronous machines: equivalent circuit, real and reactive power control, two-axis machine model. Transmission lines, Underground Cables, Capacitors, Reactors, Single and three-phase induction motors, Load modelling.

Power system analysis 410 (EKK 410)

Qualification Undergraduate

Module credits 16.00

Programmes [BEng Electrical Engineering](#)
[BEng Electrical Engineering ENGAGE](#)

Prerequisites EKK 320 GS

Contact time 1 practical per week, 1 tutorial per week, 4 lectures per week

Language of tuition Module is presented in English

Department Electrical, Electronic and Computer Engineering

Period of presentation Semester 1

Module content

Power flow: bus admittance matrix, bus impedance matrix, Gauss Seidal and Newton Raphson methods. Fault analysis: balanced fault analysis, symmetrical components, unbalanced fault analysis. Power system protection: definite time, inverse-definite-minimum-time (IDMT), introduction to over-current and earth fault protection, distribution system protection, transmission system protection, reticulation system protection. Sizing of protection devices. High voltage control: over-voltages, transients.

Economics 110 (EKN 110)

Qualification Undergraduate

Module credits 10.00

Programmes

BA
 BAdmin Public Management and International Relations
 BCom
 BCom Accounting Sciences
 BCom Agribusiness Management
 BCom Business Management
 BCom Econometrics
 BCom Economics
 BCom Financial Sciences
 BCom Human Resource Management
 BCom Informatics Information Systems
 BCom Investment Management
 BCom Law
 BCom Marketing Management
 BCom Statistics
 BCom Statistics and Data Science
 BCom Supply Chain Management
 BConSci Clothing Retail Management
 BConSci Food Retail Management
 BConSci Hospitality Management
 BEd Senior Phase and Further Education and Training Teaching
 BIT Information Systems
 BPolSci International Studies
 BPolSci Political Studies
 BSc Actuarial and Financial Mathematics
 BSc Applied Mathematics
 BSc Construction Management
 BSc Extended programme - Mathematical Sciences
 BSc Mathematical Statistics
 BSc Mathematics
 BSc Quantity Surveying
 BSc Real Estate
 BScAgric Agricultural Economics and Agribusiness Management
 BSocSci Industrial Sociology and Labour Studies
 BSocSci Philosophy, Politics and Economics
 BTRP

Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Humanities Faculty of Natural and Agricultural Sciences
Prerequisites	No prerequisites.
Contact time	1 discussion class per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Economics
Period of presentation	Semester 1

Module content

This module deals with the core principles of economics. A distinction between macroeconomics and microeconomics is made. A discussion of the market system and circular flow of goods, services and money is followed by a section dealing with microeconomic principles, including demand and supply analysis, consumer behaviour and utility maximisation, production and the costs thereof, and the different market models and firm behaviour. Labour market institutions and issues, wage determination, as well as income inequality and poverty are also addressed. A section of money, banking, interest rates and monetary policy concludes the course.

Economics 120 (EKN 120)

Qualification Undergraduate

Module credits 10.00

Programmes

BA
BAdmin Public Management and International Relations
BCom
BCom Accounting Sciences
BCom Agribusiness Management
BCom Business Management
BCom Econometrics
BCom Economics
BCom Financial Sciences
BCom Human Resource Management
BCom Informatics Information Systems
BCom Investment Management
BCom Law
BCom Marketing Management
BCom Statistics
BCom Statistics and Data Science
BCom Supply Chain Management
BConSci Clothing Retail Management
BConSci Food Retail Management
BConSci Hospitality Management
BEd Senior Phase and Further Education and Training Teaching
BIT Information Systems
BPolSci International Studies
BPolSci Political Studies
BSc Actuarial and Financial Mathematics
BSc Applied Mathematics
BSc Construction Management
BSc Extended programme - Mathematical Sciences
BSc Mathematical Statistics
BSc Mathematics
BSc Quantity Surveying
BSc Real Estate
BScAgric Agricultural Economics and Agribusiness Management
BSocSci Philosophy, Politics and Economics
BTRP

Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Humanities Faculty of Natural and Agricultural Sciences
Prerequisites	EKN 110 GS or EKN 113 GS and at least 4 (50-59%) in Mathematics in the Grade 12 examination or 60% in STK 113 and concurrently registered for STK 123
Contact time	1 discussion class per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Economics
Period of presentation	Semester 2

Module content

This module deals with the core principles of economics, especially macroeconomic measurement the private and public sectors of the South African economy receive attention, while basic macroeconomic relationships and the measurement of domestic output and national income are discussed. Aggregate demand and supply analysis stands core to this course which is also used to introduce students to the analysis of economic growth, unemployment and inflation. The microeconomics of government is addressed in a separate section, followed by a section on international economics, focusing on international trade, exchange rates and the balance of payments. The economics of developing countries and South Africa in the global economy conclude the course.

Economics 214 (EKN 214)

Qualification	Undergraduate
Module credits	16.00

Programmes

[BAdmin Public Management and International Relations](#)
[BCom](#)
[BCom Econometrics](#)
[BCom Economics](#)
[BCom Investment Management](#)
[BCom Law](#)
[BCom Statistics](#)
[BCom Statistics and Data Science](#)
[BEd Senior Phase and Further Education and Training Teaching](#)
[BPolSci International Studies](#)
[BPolSci Political Studies](#)
[BSc Applied Mathematics](#)
[BSc Mathematical Statistics](#)
[BSc Mathematics](#)
[BSocSci Philosophy, Politics and Economics](#)
[BTRP](#)

Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Humanities Faculty of Natural and Agricultural Sciences
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Prerequisites	EKN 110 GS & EKN 120 OR EKN 113 GS & EKN 123; & STK 110 GS OR STK 113 & STK 123 & STK 120/121 or concurrently registered for STK 120/121 OR WST 111 & WST121 are prerequisites instead of STK 120/121 or WST 111 and concurrently registered for WST 121.
Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	Economics
Period of presentation	Semester 1

Module content

Macroeconomics

From Wall and Bay Street to Diagonal Street: a thorough understanding of the mechanisms and theories explaining the workings of the economy is essential. Macroeconomic insight is provided on the real market, the money market, two market equilibrium, monetarism, growth theory, cyclical analysis, inflation, Keynesian general equilibrium analysis and fiscal and monetary policy issues.

Economics 234 (EKN 234)

Qualification Undergraduate

Module credits 16.00

Programmes

[BAdmin Public Management and International Relations](#)
[BCom](#)
[BCom Econometrics](#)
[BCom Economics](#)
[BCom Investment Management](#)
[BCom Law](#)
[BCom Statistics](#)
[BCom Statistics and Data Science](#)
[BEd Senior Phase and Further Education and Training Teaching](#)
[BSc Applied Mathematics](#)
[BSc Mathematics](#)
[BSocSci Philosophy, Politics and Economics](#)
[BTRP](#)

Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Humanities Faculty of Natural and Agricultural Sciences
Prerequisites	EKN 214 and STK 120/121 or WST 121 OR concurrently registered for STK 120/121 or WST 121.
Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	Economics
Period of presentation	Semester 2

Module content

Macroeconomics

Application of the principles learned in EKN 214 on the world we live in. We look at international markets and dynamic macroeconomic models, and familiarise the students with the current macroeconomic policy debates. We also take a look at the latest macroeconomic research in the world. The course includes topics of the mathematical and econometric analysis of macroeconomic issues.

Economics 310 (EKN 310)

Qualification Undergraduate

Module credits 20.00

Programmes

[BAdmin Public Management and International Relations](#)
[BCom](#)
[BCom Agribusiness Management](#)
[BCom Econometrics](#)
[BCom Economics](#)
[BCom Investment Management](#)
[BCom Law](#)
[BCom Statistics](#)
[BCom Statistics and Data Science](#)
[BPolSci International Studies](#)
[BPolSci Political Studies](#)
[BSc Applied Mathematics](#)
[BSc Mathematical Statistics](#)
[BSc Mathematics](#)
[BScAgric Agricultural Economics and Agribusiness Management](#)
[BSocSci Philosophy, Politics and Economics](#)
[BTRP](#)

Service modules

Faculty of Engineering, Built Environment and Information Technology
Faculty of Education
Faculty of Humanities
Faculty of Natural and Agricultural Sciences

Prerequisites EKN 214, EKN 234 or EKN 224, EKN 244

Contact time 1 discussion class per week, 2 lectures per week

Language of tuition Module is presented in English

Department Economics

Period of presentation Semester 1

Module content

Public finance

Role of government in the economy. Welfare economics and theory of optimality. Ways of correcting market failures. Government expenditure theories, models and programmes. Government revenue. Models on taxation, effects of taxation on the economy. Assessment of taxation from an optimality and efficiency point of view. South African perspective on public finance.

Economics 320 (EKN 320)

Qualification Undergraduate

Module credits 20.00

Programmes

BAdmin Public Management and International Relations
BCom
BCom Agribusiness Management
BCom Econometrics
BCom Economics
BCom Investment Management
BCom Law
BCom Statistics
BCom Statistics and Data Science
BPolSci International Studies
BPolSci Political Studies
BSc Applied Mathematics
BSc Mathematical Statistics
BSc Mathematics
BScAgric Agricultural Economics and Agribusiness Management
BSocSci Philosophy, Politics and Economics
BTRP

Service modules

Faculty of Engineering, Built Environment and Information Technology
Faculty of Education
Faculty of Humanities
Faculty of Natural and Agricultural Sciences

Prerequisites EKN 310 GS

Contact time 1 discussion class per week, 2 lectures per week

Language of tuition Module is presented in English

Department Economics

Period of presentation Semester 2

Module content

Economic analyses

Identification, collection and interpretation process of relevant economic data; the national accounts (i.e. income and production accounts, the national financial account, the balance of payments and input-output tables); economic growth; inflation; employment, unemployment, wages, productivity and income distribution; business cycles; financial indicators; fiscal indicators; social indicators; international comparisons; relationships between economic time series - regression analysis; long-term future studies and scenario analysis; overall assessment of the South African economy from 1994 onwards.

Wireless sensor networks 732 (EKS 732)

Qualification Postgraduate

Module credits 32.00

Programmes

BEngHons Computer Engineering
BEngHons Electronic Engineering

Prerequisites	ERN 780
Contact time	32 contact hours per semester
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Semester 1 or Semester 2

Module content

WSN consist of individual nodes interacting with their environment by sensing or controlling physical parameters; these nodes have to collaborate (using wireless communication) to fulfil their tasks. The course can be structured in two parts: architectures covering single node and network architectures, and communication protocols focusing on algorithms and protocols relevant to wireless sensor networks. The latter include the physical layer, MAC protocols, link-layer, naming and addressing, time synchronisation, localisation and positioning, topology control, routing protocols, data-centric and content-based networking, transport layer and QoS, and advanced application support (e.g. security).

Electronic defence - electronic countermeasures 780 (ELB 780)

Qualification	Postgraduate
Module credits	32.00
Programmes	BEngHons Electronic Engineering
Prerequisites	No prerequisites.
Contact time	10 lectures per week
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Semester 1 or Semester 2

Module content

Radar, including aspects such as: radar frequency bands and their characteristics, radar types (eg tracking vs search radar), the radar range equation, radar cross-section (RCS), target characteristics such as scintillation and glint, pulse compression, coherent and non-coherent integration (eg Doppler processing), range and Doppler ambiguities, target tracking including simple tracking filters and angle-tracking techniques (eg monopulse), high range-resolution (HRR) techniques, and environmental effects such as atmospheric attenuation and multipath. Electronic attack (EA) - also referred to as jamming or electronic countermeasure (ECM) - including the relationship between good system design and EP, and basic EP techniques to counter the EA techniques listed above.

Electronic defence - electronic support 781 (ELB 781)

Qualification	Postgraduate
Module credits	32.00
Programmes	BEngHons Electronic Engineering
Prerequisites	No prerequisites.

Contact time	32 contact hours per semester
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Semester 1 or Semester 2

Module content

The role of electronic support (ES) receivers from tactical and strategic perspectives. ES system architectures including analogue and digital receivers. The following topics will be considered: signal detection, parameter estimation including direction finding (DF) angle of arrival (AoA) estimation and pulse repetition interval (PRI) tracking, emitter classification and low probability of detection (LPD) and low probability of intercept (LPI) techniques to counter ES receivers.

Linear systems 220 (ELI 220)

Qualification Undergraduate

Module credits 16.00

Programmes

[BEng Computer Engineering](#)
[BEng Computer Engineering ENGAGE](#)
[BEng Electrical Engineering](#)
[BEng Electrical Engineering ENGAGE](#)
[BEng Electronic Engineering](#)
[BEng Electronic Engineering ENGAGE](#)

Prerequisites EIR 211/221 GS

Contact time 1 practical per week, 1 tutorial per week, 3 lectures per week

Language of tuition Module is presented in English

Department Electrical, Electronic and Computer Engineering

Period of presentation Semester 2

Module content

Frequency domain analysis of linear time-invariant systems. Laplace, Fourier and Z-transforms applied to periodic, aperiodic and sampled signals; exponential and trigonometric Fourier series. Nyquist sampling theorem, transfer functions, poles and zeros, bandwidth and rise time, frequency response, impulse response, Bode diagrams, natural frequency, natural and forced response. Instability and oscillations. Computer simulation.

Electronic engineering design 320 (ELO 320)

Qualification Undergraduate

Module credits 16.00

Programmes

[BEng Electronic Engineering](#)
[BEng Electronic Engineering ENGAGE](#)

Prerequisites EMK 310 GS

Contact time 1 tutorial per week, 2 lectures per week, 2 practicals per week

Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Semester 2

Module content

In this module, students are required to generate a creative system design through synthesis and integration of components and subsystems. Students have to acquire technical knowledge through independent learning, and demonstrate a competency to work in a technical design team to realise and demonstrate a working product. This practical component is augmented by theoretical instruction in the fundamentals of system engineering, industry standards and practices, PCB layout techniques, and packaging technology.

Solid-state lighting 732 (ELV 732)

Qualification	Postgraduate
Module credits	32.00
Prerequisites	No prerequisites.
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Semester 1

Module content

Photometry (quantities, units and definitions), light and vision (photopic, scotopic and mesopic), solid-state light sources, LED and OLED sources (luminous efficacy, rated life, thermal dependence, etc.), drive and control electronics for SSL (linear and on-linear dimming, thermal and light feed-back control, luminaire fundamentals and design, lighting design (CAD), specific lighting applications (task and ambient, indoor and outdoor, safety and security, automotive), SSL measurements (photometric, colorimetric, electrical and thermal). Cost-effective energy efficiency: principles and life cycle cost calculations. International standards and testing.

Electrical machines 311 (ELX 311)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Electrical Engineering BEng Electrical Engineering ENGAGE
Prerequisites	EIR 211/221
Contact time	1 practical per week, 1 tutorial per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Semester 1

Module content

Magnetic circuits: flux, flux density, reluctance, hysteresis, MMF. Magnetic Energy, Conversion: Process, field energy, mechanical force in electromagnetic systems. Transformers: Types of transformers, per unit system, voltage regulation and efficiency, three phase circuit analysis. Principles of machines: Torque, speed, efficiency and heat loss, circuit models. Machines: Power transformers, DC motors, induction motors.

Antenna theory 780 (EMA 780)

Qualification	Postgraduate
Module credits	32.00
Programmes	BEngHons Electronic Engineering
Prerequisites	Microwaves and antennas EMZ 320 or equivalent
Contact time	32 contact hours per semester
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Semester 2

Module content

Types of antennas and radiation mechanisms, parameters of antennas, radiation integrals, near and far field radiation, duality theorem, wire antennas, antenna arrays, mutual coupling and mutual impedance, surface equivalence theorem, reaction theorem, moment methods in antenna analysis, travelling wave antennas, microstrip antennas, horn antennas, physical optics, reflector antennas, antenna synthesis.

Multivariable control systems 732 (EMB 732)

Qualification	Postgraduate
Module credits	32.00
Programmes	BEngHons Electrical Engineering BEngHons Electronic Engineering
Prerequisites	Introductory control course such as EBB 320
Contact time	32 contact hours per semester
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Semester 2

Module content

Introduction to linear dynamic systems: Modes, stability, controllability, observability, multivariable poles and zeros, state-space and transfer function descriptions. Singular values and singular value decomposition. Feedback performance specifications in the frequency domain. Synthesis via state space methods. Optimal control techniques, model predictive control.

Electromagnetic compatibility 310 (EME 310)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Computer Engineering BEng Computer Engineering ENGAGE
Prerequisites	No prerequisites.
Contact time	1 practical per week, 1 tutorial per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Semester 1

Module content

Introduction - electromagnetic spectrum, parameters of digital signals, circuit theory vs. microwave techniques; Transmission lines - lumped element model, transmission line equations, wave propagation, lossless lines, input impedance, short and open circuited and $\lambda/4$ lines, power flow, transients, S-parameters; Electrodynamics fields - plane waves, propagation in dielectrics and conductors, shields, Lenz's law, Faraday's law, Maxwell's equations, transformers, storage fields vs. radiation fields, near and far fields, mechanisms of radiation; Static electric and magnetic fields - sources of fields, voltage, electrostatic induction, capacitance, electric and magnetic dipoles, permittivity, permeability, conductivity, magnetic materials, etc.; Non-ideal components - non-ideal resistor, - inductor, - capacitor, - wires, high-frequency measurements; Electromagnetic compatibility - spectrum of digital signals, interference, PCB layout, PCB shielding, grounding methods, power supply decoupling, ground loops, differential and common mode radiation, cable shielding.

Analogue electronic design 732 (EME 732)

Qualification	Postgraduate
Module credits	32.00
Programmes	BEngHons Electronic Engineering BEngHons Microelectronic Engineering
Prerequisites	EME 732 (E5), 3rd year Electronics or equivalent or permission from the lecturer
Contact time	32 contact hours per semester
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Semester 1

Module content

The integrated circuit (IC) or “chip” is the motor of the present electronic revolution. The ever-increasing impact of electronics is driven mainly by large-scale ICs such as processor and memory chips. The electronic circuit techniques used in these chips can only be understood on a deep level by a study of classical analogue electronics aimed at integrated circuit design for fabrication in CMOS, bipolar and BiCMOS processes. In addition, analog circuit techniques perform an essential role in the interfaces between the “real world” and digital systems. Examples are: voltage references, amplifiers, filters, level-converters, buffers. Important topics in this respect are feedback and stability theory as specialized for electronic circuits. The course includes: IC fabrication technology, models for IC transistors, transistor current sources and amplifiers, output stages, operational amplifiers, frequency response and stability of feedback amplifiers, nonlinear and computational circuits.

Electromagnetic compatibility 780 (EME 780)

Qualification	Postgraduate
Module credits	32.00
Prerequisites	No prerequisites.
Contact time	32 contact hours per semester
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Semester 2

Microprocessors 310 (EMK 310)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Computer Engineering BEng Computer Engineering ENGAGE BEng Electrical Engineering BEng Electrical Engineering ENGAGE BEng Electronic Engineering BEng Electronic Engineering ENGAGE
Prerequisites	ERS 220 GS, ELI 220 GS, ENE 310/ ENE 310#
Contact time	1 practical per week, 1 tutorial per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Semester 1

Module content

Hardware based introduction to system designing microprocessors. General microprocessor architecture assembly language and limited C embedded code development, with specific focus on a RISC (Microchip PIC 18) and MIPS (Microchip PIC 32) type processor, memory interfacing and address decoding, microprocessor input/output and interfacing, general programming concepts, general microprocessor system design principles, current trends and new processors exposure to development boards and integrated development environments.

Communication electronics 732 (EMK 732)

Qualification	Postgraduate
Module credits	32.00
Programmes	BEngHons Electronic Engineering BEngHons Microelectronic Engineering
Prerequisites	No prerequisites.
Contact time	32 contact hours per semester
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Semester 2

Module content

Introduction to radio communication systems, small signal amplifiers, multistage amplifiers, differential amplifiers, network noise, intermodulation distortion, noise factor and sensitivity, frequency selective networks, impedance matching, high frequency amplifiers, broadbanding techniques, AGC, oscillators, phase-locked loops, PLL applications, frequency synthesizers, power amplifiers, modulators and demodulators, frequency mixers.

Microwave theory 780 (EMM 780)

Qualification	Postgraduate
Module credits	32.00
Programmes	BEngHons Electronic Engineering
Prerequisites	EMZ 320 or equivalent
Contact time	32 contact hours per semester
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Semester 1

Module content

Review of EM theory and transmission lines, analysis of transmission lines and waveguides, microwave network analysis, impedance matching, power dividers, couplers and hybrids, microwave filters.

Introduction to programming and computer simulations 101 (EMR 101)

Qualification	Undergraduate
Module credits	4.00
Programmes	BEng Computer Engineering BEng Computer Engineering ENGAGE BEng Electrical Engineering BEng Electrical Engineering ENGAGE BEng Electronic Engineering BEng Electronic Engineering ENGAGE

Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Year

Module content

This module is presented during the recess period at the end of the first semester. The module serves as an introduction to programming and computer simulations using a high-level industry-standard programming language to develop and support problem solving. Students will be informed by the Department if, for practical reasons, the module needs to be offered in a different time slot.

Modulation systems 310 (EMS 310)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Electronic Engineering BEng Electronic Engineering ENGAGE
Prerequisites	ELI 220 GS
Contact time	1 practical per week, 1 tutorial per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Semester 1

Module content

Introduction to communication systems. Signals and the signal space, correlation, orthogonal signals, revision of the exponential Fourier series. Analysis and transmission of signals, revision of the Fourier transform, transmission channels and channel distortion, signal power and power spectral density. Analog modulation systems: amplitude modulation (AM), single sideband (SSB), vestigial sideband (VSB), phase modulation (PM), frequency modulation (FM). The phase locked loop (PLL). Sampled Systems (sampling theorem, aliasing). Pulse coded modulation (PCM) and quantisation noise, adaptive differential PCM (AD-PCM), delta modulation, pulse width modulation (PWM). Introduction to digital modulation. Line coding, pulse shaping, Nyquist's criterion, partial response signalling, digital receivers (equalisation and synchronisation), eye diagrams, digital modulation techniques: binary and M-ary amplitude shift keying (ASK), phase shift keying (PSK), frequency shift keying (M-FSK). The focus will be on analog and digital modulation techniques as applied to radio communication systems.

Research report 785 (EMW 785)

Qualification	Postgraduate
Module credits	30.00
Programmes	BScHons Real Estate BScHons Real Estate Retail Property
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English

Department	Construction Economics
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Period of presentation	Year
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Module content

A research report on a subject approved by the Head of Department has to be completed during the final year of study.

Dissertation: Real estate 890 (EMW 890)

Qualification	Postgraduate
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Module credits	180.00
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Programmes	MSc Real Estate
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Prerequisites	No prerequisites.
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Language of tuition	Module is presented in English
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Department	Construction Economics
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Period of presentation	Year
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Mini-dissertation: Real estate 892 (EMW 892)

Qualification	Postgraduate
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Module credits	60.00
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Programmes	MSc Real Estate Retail Property (Coursework) MSc Real Estate (Coursework)
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Prerequisites	No prerequisites.
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Language of tuition	Module is presented in English
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Department	Construction Economics
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Period of presentation	Year
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Thesis: Real estate 990 (EMW 990)

Qualification	Postgraduate
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Module credits	360.00
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Programmes	PhD Real Estate
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Prerequisites	No prerequisites.
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Language of tuition	Module is presented in English
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Department	Construction Economics
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Period of presentation	Year
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Electromagnetism 310 (EMZ 310)

Qualification	Undergraduate
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Module credits	16.00
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Programmes	BEng Electrical Engineering BEng Electrical Engineering ENGAGE BEng Electronic Engineering BEng Electronic Engineering ENGAGE
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Prerequisites	WTW 238 GS, WTW 263 GS, EIR 211/221 GS
Contact time	1 practical per week, 1 tutorial per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Semester 1

Module content

Transmission line equations, wave propagation, input impedance, power flow; Electrostatics, charge and current, laws of Coulomb and Gauss, scalar potential, properties of materials, boundary conditions, capacitance, Magnetostatics, laws of Biot-Savart and Ampère, magnetic properties of materials, boundary conditions; Plane wave propagation, polarisation, power density; Wave reflection and transmission, normal and oblique incidence.

Microwaves and antennas 320 (EMZ 320)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Electronic Engineering BEng Electronic Engineering ENGAGE
Prerequisites	EMZ 310 GS, ENE 310 GS
Contact time	1 practical per week, 1 tutorial per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Semester 2

Module content

Smith Chart;transients; Waveguides, stripline, microstripline; Network analysis,S-parameters, signal flow diagrams, matching networks; Power divider; Filter implementation, Richard's transformation, Kuroda's identities; Antenna fundamentals, port and radiation characteristics, Friis transmission equation, halfwave dipole, aperture antennas, linear arrays, microstrip patch antenna and arrays; Antenna applications, satellite, base stations, adaptive beams; Radar range equation.

Research methodology 732 (ENA 732)

Qualification	Postgraduate
Module credits	32.00
Prerequisites	No prerequisites.
Contact time	32 contact hours per semester
Language of tuition	Module is presented in English

Department	Electrical, Electronic and Computer Engineering
Period of presentation	Semester 2

Analogue electronics 310 (ENE 310)

Qualification	Undergraduate
Module credits	16.00

Programmes	BEng Computer Engineering BEng Computer Engineering ENGAGE BEng Electrical Engineering BEng Electrical Engineering ENGAGE BEng Electronic Engineering BEng Electronic Engineering ENGAGE
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Prerequisites	ELI 220 GS
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Contact time	1 practical per week, 1 tutorial per week, 3 lectures per week
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Language of tuition	Separate classes for Afrikaans and English
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Department	Electrical, Electronic and Computer Engineering
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Period of presentation	Semester 1
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Module content

Amplifier concepts: gain, input impedance, output impedance, bandwidth, cascaded stages. Amplifier power dissipation and power efficiency. Operational amplifiers: non-ideal, limitations, low power, programmable. Diode operational circuits: Logarithmic amplifiers, peak detector, clamp, absolute value, voltage regulators. Feedback and stability in amplifiers. Operational circuits: Instrumentation amplifiers, multipliers, oscillators, filters, translinear circuits, and sampling electronics.

Advanced electronics 410 (ENE 410)

Qualification	Undergraduate
Module credits	16.00

Programmes	BEng Electronic Engineering BEng Electronic Engineering ENGAGE
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Prerequisites	ENE 310 GS
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Contact time	1 practical per week, 1 tutorial per week, 3 lectures per week
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Language of tuition	Module is presented in English
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Department	Electrical, Electronic and Computer Engineering
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Period of presentation	Semester 1
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Module content

Bipolar and Field Effect Transistor (FET) amplifier design: bias and frequency response of small signal loaded single stage, multistage, differential stage, and feedback amplifiers. Amplifier figure of merit parameters, including total harmonic distortion. Large signal power amplifiers. Communication electronics: RF component modelling, two-port models for RF networks, matching networks, small signal narrowband RF amplifiers, RF oscillators.

English 110 (ENG 110)

Qualification	Undergraduate
Module credits	12.00
Programmes	BA BA Extended programme BA Fine Arts BA Languages BA Law BAdmin Public Management and International Relations BCom Law BDiv BEd Foundation Phase Teaching BEd Intermediate Phase Teaching BEd Senior Phase and Further Education and Training Teaching BIS Information Science BIS Publishing BPolSci International Studies BPolSci Political Studies BTh LLB
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Economic and Management Sciences Faculty of Law Faculty of Health Sciences
Prerequisites	No prerequisites.
Contact time	1 discussion class per week, 2 lectures per week, 2 web-based periods per week
Language of tuition	Module is presented in English
Department	English
Period of presentation	Semester 1

Module content

*Alternative evening classes - 2 discussion classes per week Introduction to Literature in English (1) This module introduces the study of literature by examining a number of texts representing different genres (poetry, prose, drama). The texts studied here will be mainly from the pre-twentieth century era and may include texts written in English from both Africa and other parts of the world. The aim of this module is to equip students with the critical and analytical skills required for a perceptive reading of poetry, novels and plays.

English for specific purposes 118 (ENG 118)

Qualification Undergraduate

Module credits 12.00

Programmes BA
BA Extended programme
BA Languages
BAdmin Public Management and International Relations
BCom Law
BIS Publishing
BSW
LLB

Service modules Faculty of Engineering, Built Environment and Information Technology
Faculty of Economic and Management Sciences
Faculty of Law

Prerequisites No prerequisites.

Contact time 2 lectures per week

Language of tuition Module is presented in English

Department English

Period of presentation Semester 1

Module content

This module is intended to equip students with a thorough knowledge of English grammar and is particularly useful for those interested in a career in teaching, editing, document design or other forms of language practice.

English 120 (ENG 120)

Qualification Undergraduate

Module credits 12.00

Programmes BA
BA Extended programme
BA Fine Arts
BA Languages
BA Law
BAdmin Public Management and International Relations
BCom Law
BDiv
BEd Foundation Phase Teaching
BEd Intermediate Phase Teaching
BEd Senior Phase and Further Education and Training Teaching
BIS Information Science
BIS Publishing
BPolSci International Studies
BPolSci Political Studies
BTh
LLB

Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Economic and Management Sciences Faculty of Law Faculty of Health Sciences
Prerequisites	No prerequisites.
Contact time	1 discussion class per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	English
Period of presentation	Semester 2

Module content

*Alternative evening classes: 2 discussion classes per week

Introduction to Literature in English (2)

This module introduces the study of post-nineteenth century literature by examining a number of texts representing different genres (poetry, drama, prose). Texts will be from both Africa and other parts of the world. By the end of this module students should have the background and analytical skills to perceptively read modern and contemporary poetry, novels and plays.

Modern English literature and English studies 210 (ENG 210)

Qualification	Undergraduate
Module credits	20.00
Programmes	BA BA Languages BA Law BEd Foundation Phase Teaching BEd Intermediate Phase Teaching BEd Senior Phase and Further Education and Training Teaching BIS Publishing BPolSci International Studies BPolSci Political Studies

Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education
Prerequisites	ENG 110, ENG 120
Contact time	2 discussion classes per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	English
Period of presentation	Semester 1

Module content

*Alternative evening classes - 3 discussion classes per week

Modern English literature and English language studies

This module focuses on post-nineteenth century literature in English as well as on historical and theoretical aspects of the English language.

English 220 (ENG 220)

Qualification Undergraduate

Module credits 20.00

Programmes [BA](#)
[BA Languages](#)
[BA Law](#)
[BEd Foundation Phase Teaching](#)
[BEd Intermediate Phase Teaching](#)
[BEd Senior Phase and Further Education and Training Teaching](#)
[BIS Publishing](#)
[BPolSci International Studies](#)
[BPolSci Political Studies](#)

Service modules Faculty of Engineering, Built Environment and Information Technology
Faculty of Education

Prerequisites ENG 110, ENG 120

Contact time 2 discussion classes per week, 2 lectures per week

Language of tuition Module is presented in English

Department English

Period of presentation Semester 2

Module content

*Alternative evening classes - 3 discussion classes per week

Twentieth-century, postcolonial and contemporary literature

This module focuses on post-nineteenth century literature in English. Various genres are covered and particular attention is given to postcolonial writing.

English 310 (ENG 310)

Qualification Undergraduate

Module credits 30.00

Programmes [BA](#)
[BA Languages](#)
[BA Law](#)
[BEd Senior Phase and Further Education and Training Teaching](#)
[BIS Publishing](#)
[BPolSci International Studies](#)
[BPolSci Political Studies](#)

Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education
Prerequisites	ENG 210, ENG 220
Contact time	2 discussion classes per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	English
Period of presentation	Semester 1

Module content

Reading Medieval and Early Modern literature

In this module students study the works of writers such as Chaucer, Shakespeare, Milton and Pope. The general characteristics and techniques of these authors are discussed in relation to developments in aesthetic theory, generic conventions and socio-historical change.

English 320 (ENG 320)

Qualification	Undergraduate
Module credits	30.00
Programmes	BA BA Languages BA Law BEd Senior Phase and Further Education and Training Teaching BIS Publishing BPolSci International Studies BPolSci Political Studies

Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education
Prerequisites	ENG 220
Contact time	2 discussion classes per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	English
Period of presentation	Semester 2

Module content

Reading the Nineteenth Century

In this module students read a selection of 19th-century texts in English. The general characteristics and techniques of these texts are discussed in relation to developments in aesthetic theory, generic conventions and socio-historical change.

Energy optimisation 732 (ENO 732)

Qualification	Postgraduate
Module credits	32.00

Programmes	BEngHons Electrical Engineering BEngHons Electronic Engineering
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Prerequisites	No prerequisites.
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Contact time	32 contact hours per semester
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Language of tuition	Module is presented in English
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Department	Electrical, Electronic and Computer Engineering
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Period of presentation	Semester 1
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Module content

In this module, a brief introduction about energy systems, energy system modelling and optimisation, and Matlab applications in energy optimisation problems are given. Practical industrial (as well as residential) energy management problems such as the load shifting for geysers, conveyor belts and pumping systems in terms of time-of-use tariff and/or maximum demand charge are covered.

Research project 420 (ENR 420)

Qualification	Undergraduate
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Module credits	16.00
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Programmes	BEng Electrical Engineering BEng Electrical Engineering ENGAGE
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Prerequisites	No prerequisites.
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Contact time	1 tutorial per week, 2 lectures per week, 2 practicals per week
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Language of tuition	Module is presented in English
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Department	Electrical, Electronic and Computer Engineering
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Period of presentation	Semester 2
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Module content

Specific niche areas from electrical engineering are addressed within the context of a research project. The student should be able to demonstrate competence in designing and conducting investigations and experiments; to analyse the results; to select and use appropriate engineering tools and software; to interpret and derive information from the data; to draw conclusions based on evidence and to communicate the purpose, process and outcomes in a report.

Introduction to environmental sciences 101 (ENV 101)

Qualification	Undergraduate
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Module credits	8.00
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Programmes	BA
	BA Extended programme
	BA Languages
	BEd Intermediate Phase Teaching
	BEd Senior Phase and Further Education and Training Teaching
	BPolSci International Studies
	BSc Chemistry
	BSc Computer Science
	BSc Environmental Sciences
	BSc Extended programme - Physical Sciences
	BSc Geography
	BSc Geoinformatics
	BSc Information and Knowledge Systems
	BSc Meteorology
	BSocSci Heritage and Cultural Tourism

Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Humanities
Prerequisites	No prerequisites.
Contact time	1 practical per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Geography Geoinformatics and Meteorology
Period of presentation	Quarter 1

Module content

Introducing the basic concepts and interrelationships required to understand the complexity of natural environmental problems, covering an introduction to environmental science and biogeography; including a first introduction to SDGs and Aichi targets.

Optical networking 716 (ENW 716)

Qualification	Postgraduate
Module credits	16.00
Prerequisites	No prerequisites.
Contact time	16 contact hours per semester
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Semester 2

Optical design 732 (EOD 732)

Qualification	Postgraduate
Module credits	32.00
Prerequisites	No prerequisites.

Contact time	32 contact hours per semester
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Semester 2

Module content

Review of thin lenses, image formation and first-order properties of imaging systems, optical transfer functions, aberration theory, imaging systems: telescopes, microscopes, etc., optical design methodology.

Detection and estimation 732 (EOP 732)

Qualification	Postgraduate
Module credits	32.00
Prerequisites	Theory of bayesian inference ETB732
Contact time	32 contact hours per semester
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Semester 2

Module content

Binary hypotheses, M hypothesis, decision criteria, performance. Estimation theory: Random parameters, Bayes estimation, multiple parameter estimation. Composite hypotheses. The general Gaussian problem. Performance bounds and approximations. Representations of random processes. Detection of signals-estimation of signal parameters, including detection in non-white noise, sufficient statistics. Signals with unwanted parameters, the composite hypothesis problem.

Academic literacy (1) 110 (EOT 110)

Qualification	Undergraduate
Module credits	6.00
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Economic and Management Sciences Faculty of Health Sciences Faculty of Natural and Agricultural Sciences Faculty of Theology and Religion Faculty of Veterinary Science
Prerequisites	No prerequisites.
Contact time	1 other contact session per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Unit for Academic Literacy
Period of presentation	Semester 1

Module content

An introduction to academic literacy that considers various learning styles and strategies, and provides an initial exploration of the characteristics of academic language. The module focuses initially on academic listening and speaking. Practice in collecting information for academic tasks, as well as in the processing of academic information. In addition, the module has a focus on the enhancement of academic vocabulary, and some initial and elementary academic writing is attempted.

Academic literacy (2) 120 (EOT 120)

Qualification	Undergraduate
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Module credits	6.00
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Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Economic and Management Sciences Faculty of Health Sciences Faculty of Natural and Agricultural Sciences Faculty of Theology and Religion Faculty of Veterinary Science
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Prerequisites	No prerequisites.
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Contact time	1 other contact session per week, 2 lectures per week
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Language of tuition	Module is presented in English
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Department	Unit for Academic Literacy
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Period of presentation	Semester 2
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Module content

While retaining an emphasis on the collection and processing of academic information, this module also provides sustained practice in academic reading. Similarly, we concentrate on building up an academic vocabulary specific to certain fields of study. The final part of the module brings together academic listening, reading and writing. The production of academic information in the form of argumentative writing is the focus here, i.e. we concentrate on producing academic discourse that is rational, coherent, clear and precise.

Property law 222 (EOW 222)

Qualification	Undergraduate
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Module credits	8.00
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Programmes	BSc Construction Management BSc Quantity Surveying BSc Real Estate
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Prerequisites	No prerequisites.
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Contact time	1 discussion class per week, 2 lectures per week
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Language of tuition	Module is presented in English
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Department	Construction Economics
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Period of presentation	Semester 2
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Module content

The development of an understanding of the South African Law of Property and statutes relating to immovable and real rights; the acquisition of rights over land in South Africa; forms of land tenure; possession and occupation of immovable property, survey of land, registration of rights over immovable property, servitudes, real and personal securities, subdivision of land zoning regulations.

Introduction to property law 320 (EOW 320)

Qualification	Undergraduate
Module credits	6.00
Prerequisites	No prerequisites.
Language of tuition	Separate classes for Afrikaans and English
Department	Construction Economics
Period of presentation	Semester 2

Module content

Moveable and immovable property. Rights over immovable property; private legal circumscription of ownership; relevant legislation pertaining to property; real securities; the registration of rights; zoning regulations.

Feasibility studies 700 (EOW 700)

Qualification	Postgraduate
Module credits	18.00
Prerequisites	EOW 710 GS
Language of tuition	Module is presented in English
Department	Construction Economics
Period of presentation	Year

Module content

Overview of factors affecting the feasibility of proposed developments. Detailed financial viability studies of different types of property developments.

Property development 711 (EOW 711)

Qualification	Postgraduate
Module credits	9.00
Programmes	BScHons Real Estate Retail Property
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Construction Economics
Period of presentation	Semester 1

Module content

Principles of various types of residential, commercial and industrial property developments.

Property development 801 (EOW 801)

Qualification Postgraduate

Module credits 20.00

Programmes [MSc Real Estate Retail Property \(Coursework\)](#)
[MSc Real Estate \(Coursework\)](#)

Prerequisites No prerequisites.

Contact time 40 contact hours per semester

Language of tuition Module is presented in English

Department Construction Economics

Period of presentation Year

Property development 822 (EOW 822)

Qualification Postgraduate

Module credits 10.00

Programmes [MSc Real Estate \(Coursework\)](#)

Prerequisites No prerequisites.

Contact time 10 lectures per week

Language of tuition Module is presented in English

Department Construction Economics

Period of presentation Semester 2

Shopping centre development 823 (EOW 823)

Qualification Postgraduate

Module credits 10.00

Programmes [MSc Real Estate Retail Property \(Coursework\)](#)

Prerequisites EOW 801

Contact time 10 lectures per week

Language of tuition Module is presented in English

Department Construction Economics

Period of presentation Semester 2

Module content

Principles and practical applications of viability studies for shopping centre development.

Software engineering 321 (EPE 321)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Computer Engineering BEng Computer Engineering ENGAGE
Prerequisites	COS 212
Contact time	1 practical per week, 1 tutorial per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Semester 2

Module content

Software engineering deals with the application of engineering principles to develop and maintain high-quality software that is reliable and that works efficiently. Software engineering includes defining software requirements and performing software design, software construction, software testing, and software maintenance tasks. The module exposes students to various methodologies in the different stages of the software life cycle, the problems of group work, and software configuration management with versioning systems such as CVS. The student is exposed to object modelling techniques and languages such as UML, as well as advanced debugging and testing techniques.

Project 400 (EPR 400)

Qualification	Undergraduate
Module credits	64.00
Programmes	BEng Electrical Engineering BEng Electrical Engineering ENGAGE BEng Electronic Engineering BEng Electronic Engineering ENGAGE
Prerequisites	EWE 320 (Electrical Engineering) ELO 320 (Electronic Engineering), Finalists only
Contact time	1 lecture per week
Language of tuition	Separate classes for Afrikaans and English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Year

Module content

This module entails the individual completion of an engineering project from concept to delivery. The student must demonstrate independent mastery of an engineering project. The module focuses on the formulation of an engineering problem, the development of appropriate technical specifications, project planning and management and then completion of a technical project of a given nature, scope and complexity. The nature of projects is either mainly design (design, synthesis and testing) with a smaller component of investigation (experimental work and data analysis), or, alternatively, mainly investigation with a smaller component of design. As final step in the project, the student evaluates the final outcome of the design or investigation against the specifications and he/she also evaluates the impact of the project (social, legal, safety and environmental). Oral and written technical communication is evaluated as an important part of the module.

Project 402 (EPR 402)

Qualification	Undergraduate
Module credits	64.00
Programmes	BEng Computer Engineering BEng Computer Engineering ENGAGE
Prerequisites	ERD 320 Finalists only
Contact time	1 lecture per week
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Year

Module content

This module entails the individual completion of an engineering project from concept to delivery. The student must demonstrate independent mastery of an engineering project. The module focuses on the formulation of an engineering problem, the development of appropriate technical specifications, project planning and management and then completion of a technical project of a given nature, scope and complexity. The nature of projects is either mainly design (design, synthesis and testing) with a smaller component of investigation (experimental work and data analysis), or, alternatively, mainly investigation with a smaller component of design. As final step in the project, the student evaluates the final outcome of the design or investigation against the specifications and he/she also evaluates the impact of the project (social, legal, safety and environmental). Oral and written technical communication is evaluated as an important part of the module.

Dissertation 890 (EPR 890)

Qualification	Postgraduate
Module credits	180.00
Programmes	MEng Software Engineering
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering

Period of presentation Year

Research project: Theory 732 (EPT 732)

Qualification Postgraduate

Module credits 32.00

Programmes [BEngHons Computer Engineering](#)
[BEngHons Electrical Engineering](#)
[BEngHons Electronic Engineering](#)
[BEngHons Microelectronic Engineering](#)

Prerequisites No prerequisites.

Contact time 10 lectures per week

Language of tuition Module is presented in English

Department Electrical, Electronic and Computer Engineering

Period of presentation Semester 1 or Semester 2

Module content

This module will cover the essential theoretical background of the student's proposed M Eng topic and include inter alia the following:

- (i) Field definition and descriptions
- (ii) In-depth study into background and theory relevant to the problem to be addressed
- (iii) Problem definition and description
- (iv) Mathematical simulations of the problem

Research project: Design and laboratory 733 (EPT 733)

Qualification Postgraduate

Module credits 32.00

Programmes [BEngHons Computer Engineering](#)
[BEngHons Electrical Engineering](#)
[BEngHons Electronic Engineering](#)
[BEngHons Microelectronic Engineering](#)

Prerequisites No prerequisites.

Contact time 10 lectures per week

Language of tuition Module is presented in English

Department Electrical, Electronic and Computer Engineering

Period of presentation Semester 1 or Semester 2

Module content

This module will include extensive laboratory experiments to test the principles and possible solutions of the proposed M Eng research project and will include inter alia the following. These will include hardware and/or software experiments:

- (i) Introduction to instrumentation and measuring techniques in general and specifically as applied in the field of research.
- (ii) Structured laboratory work to introduce the specific problem investigated for the research undertaken.
- (iii) Structured laboratory work to test the proposed solution for the problem addressed.
- (iv) Confirmation experiments.

Practical wiring 200 (EPW 200)

Qualification	Undergraduate
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Module credits	4.00
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Programmes	BEng Electrical Engineering BEng Electrical Engineering ENGAGE
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Prerequisites	No prerequisites.
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Contact time	1 Week
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Language of tuition	Module is presented in English
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Department	Electrical, Electronic and Computer Engineering
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Period of presentation	Year
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Module content

This module is presented during one of the recess periods during the second year of study. In this module the student will become acquainted with relevant regulations and legislation and basic aspects of wiring practice. Students will be informed by the Department if, for practical reasons, the module needs to be offered in a different time slot.

Practical training and report 423 (EPY 423)

Qualification	Undergraduate
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Module credits	16.00
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Programmes	BEng Computer Engineering BEng Computer Engineering ENGAGE BEng Electrical Engineering BEng Electrical Engineering ENGAGE BEng Electronic Engineering BEng Electronic Engineering ENGAGE
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Prerequisites	No prerequisites.
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Contact time	1 lecture per week
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Language of tuition	Module is presented in English
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Department	Electrical, Electronic and Computer Engineering
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Period of presentation	Semester 2
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Module content

Four weeks practice-orientated experience at any institution of the student's choice (preferably in electrical, electronic or computer engineering). The student must acquire experience in the working environment and more specifically work ethics, ecology, economy, punctuality, knowledge of human nature, etc. One week after the commencement of the second semester the student must submit a report on the aspects of his/her work experience as determined by the Head of the Department.

New generation networks 732 (ERC 732)

Qualification	Postgraduate
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Module credits	32.00
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Prerequisites	Computer Networks ERN 780 or BEng (Computer Engineering) UP or equivalent.
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Contact time	32 contact hours per semester
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Language of tuition	Module is presented in English
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Department	Electrical, Electronic and Computer Engineering
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Period of presentation	Semester 2
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Module content

The module in Next Generation Networks will cover evolution of communications networks towards multiservice networks and convergence. Topics be covered include the current PSTN architecture, convergence of enabling technologies, NGN architectures and APIs, softswitches, and modelling and simulation of multiservice networks. The main objective of the course is to prepare students for advanced research in next generation communications networks.

Computer engineering design 320 (ERD 320)

Qualification	Undergraduate
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Module credits	16.00
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Programmes	BEng Computer Engineering BEng Computer Engineering ENGAGE
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Prerequisites	EMK 310 GS
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Contact time	1 tutorial per week, 2 lectures per week, 2 practicals per week
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Language of tuition	Module is presented in English
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Department	Electrical, Electronic and Computer Engineering
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Period of presentation	Semester 2
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Module content

In this module, students are required to generate a creative system design through synthesis and integration of components and subsystems. Students have to acquire technical knowledge through independent learning, and demonstrate a competency to work in a technical design team to realise and demonstrate a working product. This practical component is augmented by theoretical instruction in the fundamentals of system engineering, industry standards and practices, PCB layout techniques, and packaging technology.

Introductory radiometry and photometry 716 (ERD 716)

Qualification	Postgraduate
Module credits	16.00
Prerequisites	No prerequisites.
Contact time	16 contact hours per semester
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Semester 2

Module content

Introduction to laboratory equipment, solar cell, imaging radiometry, spectral radiometry, atmospheric transmittance, wavelength calibration of a monochromator, photometric measurements, measurement of colour. Credits: 16 (must be combined with Introduction to the Science of measurement to form a 32 credit module)

Dissertation: Computer engineering 890 (ERI 890)

Qualification	Postgraduate
Module credits	180.00
Programmes	MEng Computer Engineering
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Year

Thesis: Computer engineering 990 (ERI 990)

Qualification	Postgraduate
Module credits	360.00
Programmes	PhD Computer Engineering
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Year

Computer networks 780 (ERN 780)

Qualification	Postgraduate
Module credits	32.00
Programmes	BEngHons Computer Engineering BEngHons Electronic Engineering
Prerequisites	No prerequisites.
Contact time	32 contact hours per semester
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Semester 1

Module content

Review of computer networks infrastructure: The review will cover elementary concepts in computer networks; covering data communications, wide area networks, and local area networks.

Networking protocols: This section will explore both the architectural principles and mechanisms required for the exchange of data among computers, workstations, servers, and other data processing devices. Much of the material in this part relates to the TCP/IP protocol suite. Recent developments and state-of-art issues will also be focused upon.

Applications, service models and convergence of networks: This section will look at the application layer and explore various service models in the context of convergence. Students will be introduced to various Next Generation Networks technologies and issues.

Modelling and simulation: This section will cover research issues in computer networks. Students will be introduced to modelling, simulation techniques and tools.

Research project 420 (ERP 420)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Computer Engineering BEng Computer Engineering ENGAGE
Prerequisites	No prerequisites.
Contact time	1 tutorial per week, 2 lectures per week, 2 practicals per week
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Semester 2

Module content

Specific niche areas from computer engineering are addressed within the context of a research project. The student should be able to demonstrate competence in designing and conducting investigations and experiments; to analyse the results; to select and use appropriate engineering tools and software; to interpret and derive information from the data; to draw conclusions based on evidence and to communicate the purpose, process and outcomes in a report.

Digital systems 220 (ERS 220)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Computer Engineering BEng Computer Engineering ENGAGE BEng Electrical Engineering BEng Electrical Engineering ENGAGE BEng Electronic Engineering BEng Electronic Engineering ENGAGE
Prerequisites	No prerequisites.
Contact time	1 practical per week, 1 tutorial per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Semester 2

Module content

Introduction to digital circuit design, digital representations of numbers, device electronics in digital circuits, representation and simplification of logic functions, components of combinational circuits, analysis and design of combinational circuits, components of sequential circuits, analysis and design of sequential circuits, programmable components for combinatorial and sequential logic.

Advanced topics of energy research 732 (ERT 732)

Qualification	Postgraduate
Module credits	32.00
Prerequisites	No prerequisites.
Contact time	32 contact hours per semester
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Semester 1 or Semester 2

Module content

The module focuses on the research training on supply side, energy transmission, and demand side. Some related research papers and our finished projects will be taught. Energy optimisation techniques will be trained throughout the module. The teaching material also includes some of our newest research projects so that students are getting involved in most advanced research progresses. The expected learning outcomes are: (i) ability to identify if a problem is important to be investigated; (ii) ability to search references for research problems; (iii) ability to use energy management tools to model a research problem; (iv) ability to identify suitable optimization algorithms for an optimization problem arising from an energy management mathematical model; (v) ability to write research reports.

Big data science elective 801 (ERZ 801)

Qualification	Postgraduate
Module credits	5.00
Programmes	MIT Big Data Science (Coursework)
Prerequisites	No prerequisites.
Contact time	5 contact hours
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Semester 2

Module content

Example courses may include: Intelligent systems and Internet of Things. In addition to study-leader approval, elective course selection may be subject to course pre-requisites, course availability, and internal departmental regulations as decided by the Head of the Department.

Big data science elective 802 (ERZ 802)

Qualification	Postgraduate
Module credits	5.00
Programmes	MIT Big Data Science (Coursework)
Prerequisites	No prerequisites.
Contact time	5 contact hours
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Semester 2

Module content

Example courses may include: Intelligent systems and Internet of Things. In addition to study-leader approval, elective course selection may be subject to course pre-requisites, course availability, and internal departmental regulations as decided by the Head of the Department.

Stochastic communications systems 320 (ESC 320)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Electronic Engineering BEng Electronic Engineering ENGAGE
Prerequisites	WTW 258, WTW 256, WTW 238 and EMS 310 GS
Contact time	1 practical per week, 1 tutorial per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering

Period of presentation	Semester 2
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Module content

Review of signal theory. Introduction to probability theory (probability, random variables, statistical averages, correlation, sums of random variables, and the central limit theorem), random processes (RPs) and spectral analysis (ensemble statistics, classes of RPs, power spectral density, multiple RPs, transmission of RPs through linear systems, Wiener-Hopf filtering, signal-to-noise ratios (SNRs), optimal pre/de-emphasis, and bandpass RPs). Performance characterisation of digital communication systems (optimal linear detection, matched filtering, signal detection, bit error probability, coherent receivers, optimal detection in the signal space, vector representations of RPs, optimal receivers in additive white Gaussian noise (AWGN) channels, M-ary digital modulation performance analysis, and equivalent signal sets). Spread spectrum communications (frequency-hopping spread spectrum (FHSS), direct-sequence spread spectrum (DSSS), code-division multiple access (CDMA), multiuser detection, and practical spread-spectrum systems). Linear distortive channel communication (equalisation, channel estimation, and orthogonal frequency-division multiplexing (OFDM)). Introduction to information theory (entropy, source coding, error-free communication, channel capacity in discrete and continuous memoryless channels, and frequency-selective channel capacity). Error correcting codes (redundancy, linear block codes, cyclic codes, convolutional codes, and trellis diagrams). The focus will be on applications in the cellular and mobile communication fields where stochastic processes such as noise and channel effects are of prime importance.

Electro-optical systems design 732 (ESD 732)

Qualification	Postgraduate
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Module credits	32.00
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Prerequisites	No prerequisites.
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Contact time	32 contact hours per semester
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Language of tuition	Module is presented in English
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Department	Electrical, Electronic and Computer Engineering
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Period of presentation	Semester 1
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Module content

Introduction to electro-optical system design, optical radiometry and photometry, atmospheric effects, advanced radiometry, signatures and camouflage, performance analysis, electro-optical system analysis, spectral band considerations.

DSP programming 300 (ESP 300)

Qualification	Undergraduate
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Module credits	4.00
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Programmes	BEng Electrical Engineering BEng Electrical Engineering ENGAGE
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Prerequisites	EPW 200, (ELI 220), (EMK 310)
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Contact time	Three days
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Language of tuition	Module is presented in English
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Department	Electrical, Electronic and Computer Engineering
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Period of presentation	Year
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Module content

This module is presented during one of the recess periods in the third year of study. The module is an introduction to digital signal processors (DSPs) for electrical engineering students. The first of three days is dedicated to theory lectures introducing DSP and addressing quantisation, sampling theory, anti-aliasing filters, correlation, convolution, DFT, inverse DFT, Z- transforms, digital filters (low pass, anti-aliasing, FIR and IIR) and the design thereof. PCB layout techniques, decoupling and bypass capacitors relating to digital circuits are addressed. At the end of the theory sessions students need to design a filter. The practical work over the last two days consists of implementing the filter designed as well as coding DAC, FIR, IIR and PWM for a DSP. The DAC, FIR, IIR and PWM are implemented in hardware/firmware and the results displayed on an oscilloscope. At the end of the module each student will demonstrate a working system consisting of the developed firmware and hardware performing the required signal processing functions. Students will be informed by the Department if, for practical reasons, the module needs to be offered in a different time slot.

DSP programming and application 411 (ESP 411)

Qualification	Undergraduate
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Module credits	16.00
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Programmes	BEng Computer Engineering BEng Computer Engineering ENGAGE BEng Electronic Engineering BEng Electronic Engineering ENGAGE
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Prerequisites	ESC 320 GS or EDC 310 GS
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Contact time	1 practical per week, 1 tutorial per week, 3 lectures per week
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Language of tuition	Module is presented in English
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Department	Electrical, Electronic and Computer Engineering
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Period of presentation	Semester 1
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Module content

Fourier-Transform: revise the Discrete Fourier-Transform (DFT); Fast Fourier-Transform (FFT). Digital filters; cyclic convolution; overlap-and-add as well as overlap-and-save methods; design of FIR- and IIR-filters (incorporating the effect of finite word lengths). Implementation: computer architecture and DSP processors; Mapping of DSP algorithms onto DSP hardware. Projects: simulation (in C) and real-time implementation of selected signal processing algorithms on DSP hardware.

Digital radio techniques 732 (ESR 732)

Qualification	Postgraduate
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Module credits	32.00
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Prerequisites	ETD 732
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Contact time	32 contact hours per semester
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Language of tuition	Module is presented in English
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Department	Electrical, Electronic and Computer Engineering
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Period of presentation	Semester 1 or Semester 2
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Module content

Analog vs digital radio techniques, review of baseband and bandpass sampling concepts, overview of DSP-principles, Z-Transform and digital filter design, digital modulation techniques and performance analysis, radio link power analysis and design, generic radio configurations, low noise amplifier and radio front-end design, high-speed A/D and D/A components and design, automatic gain (power) control, direct versus superheterodyne downconversion methods, IF-sampling techniques, digital radio receiver design, analog vs digital (carrier and symbol) synchronisation methods, doppler tracking, analysis and design of diversity techniques, multiple-input/multiple output (multi antenna element) systems, space-time coding, modular embedded system design and rapid prototyping (RF, CMOS and FPGA implementation techniques and technologies), computer-aided design software, tools and techniques.

Adaptive systems 732 (ETA 732)

Qualification	Postgraduate
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Module credits	32.00
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Prerequisites	ETD 732
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Contact time	32 contact hours per semester
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Language of tuition	Module is presented in English
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Department	Electrical, Electronic and Computer Engineering
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Period of presentation	Semester 1 or Semester 2
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Module content

Adaptive systems ETA732 covers the fundamentals of adaptive systems within the context of adaptive signal processing. The basic linear filtering problem with associated models and filter structures is introduced. Furthermore, the topics of stationary processes and models, spectrum analysis, eigen analysis, Wiener filters, linear prediction, Kalman filters, stochastic gradient methods and least squares methods are covered. Blind adaptive methods are presented within the context of the blind deconvolution problem. Lattice filter methods are covered as an extension to the basic topics of this course. Adaptive systems ETA732 will supply the student with valuable tools for the solution of statistical detection and estimation problems in the diverse fields of communications, control, radar, sonar, seismology and biomedical engineering.

Digital communications 732 (ETD 732)

Qualification	Postgraduate
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Module credits	32.00
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Programmes	BEngHons Computer Engineering BEngHons Electronic Engineering
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Prerequisites	No prerequisites.
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Contact time	32 contact hours per semester
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Language of tuition	Module is presented in English
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Department	Electrical, Electronic and Computer Engineering
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Period of presentation	Semester 1
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Module content

Digital Communications ETD 732 is a first semester graduate course in Electronic Engineering, presented by the Signal Processing and Telecommunications Group, in collaboration with the Centre for Radio and Digital Communication (CRDC). The content of the course is as follows: Introduction to digital communications, digital communications applications and services. Review of: probability and stochastic processes, source coding, characterisation of communication signals and systems and optimum receivers for the AWGN channel. Advanced synchronisation systems: Carrier and symbol recovery. Shannon's channel capacity theorem and introduction to coding. Signal design for band-limited channels. Digital modulation techniques. Communication through band-limited linear filter channels. Introduction to adaptive equalisation. Spread spectrum signals for digital communications. Simulation of digital communication systems. Digital realisation of digital communication subsystems. Digital communication laboratory.

Electrical drives 780 (ETE 780)

Qualification	Postgraduate
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Module credits	32.00
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Prerequisites	Undergraduate level Power electronics and Electric machines.
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Contact time	32 contact hours per semester
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Language of tuition	Module is presented in English
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Department	Electrical, Electronic and Computer Engineering
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Period of presentation	Semester 1 or Semester 2
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Module content

Power semiconductor devices and power electronic converters for drive applications. Theory of three-phase induction motor and synchronous motor machines. Adjustable speed induction motor drives: open-loop and closed-loop control, scalar and vector control, transient analysis of induction motor drives and introduction to vector/field-oriented control. Adjustable speed synchronous motor drives: Open-loop and closed-loop control, self-controlled permanent magnet synchronous motor drives. Introduction to spiral vector theory and analysis.

Information security 780 (ETH 780)

Qualification	Postgraduate
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Module credits	32.00
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Prerequisites	No prerequisites.
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Contact time	32 contact hours per semester
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Language of tuition	Module is presented in English
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Department	Electrical, Electronic and Computer Engineering
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Period of presentation	Semester 1
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Module content

Number theory: prime numbers, congruences, modular arithmetic, Euclid's algorithm, Fermat's theorem, Euler's theorem, Euler's phi-function. Block ciphers: Feistel cipher, DES, AES. Public key cryptography: RSA, Diffie-Hellman, digital signatures. Hash functions: MD 5, SHA-1, MAC, HMAC. Protocols: identification, authentication, key exchange, X.509. PGP, S/MIME, IPsec, SSL, VPN. Authentication protocols, key distribution, key management, random number generation.

Coding theory 732 (ETK 732)

Qualification	Postgraduate
Module credits	32.00
Prerequisites	ETD 732
Contact time	32 contact hours per semester
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Semester 1 or Semester 2

Module content

The module addresses the analysis and design of block, convolutional and concatenated coding schemes for mobile fading channels. Information theory concepts, such as channel capacity and cutoff rates are addressed. Galois fields and mathematical operations are investigated. The construction of binary FIR and IIR convolutional codes, and non-binary dual-k convolutional codes are considered, followed by an in-depth discussion on the classic Viterbi algorithm. Binary block codes considered in this course include cyclic, Hamming and binary BCH block codes. Classic block code decoding algorithms, such as ML, syndrome and Meggit decoders are investigated. Non-binary Reed-Solomon block codes, as well as the Berlekamp-Massey decoding algorithm are presented. The Viterbi decoding of linear block codes, using BCJR trellises are investigated. The concept of coding for fading channels are considered, with the focus on aspects such as interleaving and employing channel state information in channel decoders. Classic concatenated coding schemes are considered. Iteratively decoded concatenated coding schemes, including iteratively decoded parallel, serial and hybrid concatenated coding and coded modulation are investigated. This includes an in-depth study of iteratively decoded concatenated coding scheme building blocks, such as puncturers, interleavers, recursive systematic convolutional codes and MAP decoders. Several promising fields of channel coding currently receiving much interest, such as multilevel coding, space-time coding and bit-interleaved coded modulation, are also considered.

Topics in photonics 732 (ETP 732)

Qualification	Postgraduate
Module credits	32.00
Prerequisites	No prerequisites.
Contact time	32 contact hours per semester
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering

Period of presentation Semester 1 or Semester 2

Module content

The purpose of the Topics in Photonics course is to create the opportunity for experts to give lectures on specialised topics in the field of photonics, thus providing students with the opportunity to capitalise on the specialised knowledge of experts that are not permanently affiliated to the University.

Mobile communication 732 (ETR 732)

Qualification Postgraduate

Module credits 32.00

Prerequisites No prerequisites.

Contact time 32 contact hours per semester

Language of tuition Module is presented in English

Department Electrical, Electronic and Computer Engineering

Period of presentation Semester 2

Module content

Introduction to wireless, cellular, digital PCS mobile radio communication. Radio propagation and cellular engineering concepts. Digital MODulation-DEModulation (MODEM) techniques (cellular modulation standards). Error control coding for fading channels. Access technologies (FDMA, TDMA, CDMA, OFDMA, SDMA and hybrids). Spread-spectrum systems and concepts. Diversity techniques for mobile wireless radio systems. Cellular and wireless systems engineering (mobile cellular design). Adaptive equalisers for fading channels.

Telecommunication systems engineering 732 (ETT 732)

Qualification Postgraduate

Module credits 32.00

Programmes [BEngHons Computer Engineering](#)
[BEngHons Electronic Engineering](#)

Prerequisites No prerequisites.

Contact time 32 contact hours per semester

Language of tuition Module is presented in English

Department Electrical, Electronic and Computer Engineering

Period of presentation Semester 1 or Semester 2

Module content

Telecommunication systems engineering ETT 732 is a first semester graduate course in Electronic Engineering, presented by the Signals and Telecommunications Group. This module provides an Introduction to telecommunication concepts, telecommunication systems, virtual private networks (VPN), advanced intelligent networks (AIN), local number portability (LNP), computer-to-telephony integration (CTI), signalling system 7 (SS7), CTI technologies and application, ISDN, frame relay, ATM, ATM and frame relay internetworking, data over power lines, xDSL, microwave and radio-based systems, local multipoint distribution services (LMDS), specialized mobile radio (SMR), cellular communication, GSM, personal communication services (PCS), wireless data communication (Mobile IP), satellite communication (Networking, LEO), Sonet and SDH, wave division multiplexing (WDM), the internet (TCP/IP, VoIP, networking, management).

Feasibility studies 710 (EUS 710)

Qualification	Postgraduate
Module credits	8.00
Programmes	BScHons Construction Management BScHons Quantity Surveying
Prerequisites	No prerequisites.
Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	Construction Economics
Period of presentation	Semester 1

Module content

Overview of factors affecting the feasibility of proposed property developments, including a brief introduction to town planning, valuation, financing, marketing and investment principles.

Feasibility studies 720 (EUS 720)

Qualification	Postgraduate
Module credits	8.00
Programmes	BScHons Construction Management BScHons Quantity Surveying BScHons Real Estate
Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	Construction Economics
Period of presentation	Semester 2

Module content

Financial viability studies of different types of property developments; value management and life-cycle costing.

Feasibility studies of shopping centres 721 (EUS 721)

Qualification	Postgraduate
Module credits	9.00
Prerequisites	No prerequisites.
Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	Construction Economics
Period of presentation	Semester 2

Module content

Detailed financial viability studies of shopping centre developments; value management and life-cycle costing.

Electrical engineering design 320 (EWE 320)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Electrical Engineering BEng Electrical Engineering ENGAGE
Prerequisites	EIR 211/221 GS
Contact time	1 tutorial per week, 2 lectures per week, 2 practicals per week
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Semester 2

Module content

In this module, students are required to generate a creative system design through synthesis and integration of components and subsystems. Students have to acquire technical knowledge through independent learning, and demonstrate a competency to work in a technical design team to realise and demonstrate a working product. This practical component is augmented by theoretical instruction in the fundamentals of system engineering, industry standards and practices, design for operational feasibility, power transformer design, power cable design, power capacitor design and protection system design.

Real estate 110 (EWS 110)

Qualification	Undergraduate
Module credits	8.00
Programmes	BSc Real Estate
Prerequisites	No prerequisites.
Contact time	2 lectures per week
Language of tuition	Module is presented in English

Department	Construction Economics
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Period of presentation	Semester 1
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Module content

An introduction to real estate which aims to develop an understanding of real property: characteristics and functions of the real property market; pricing of land and resources. Welfare and economic efficiency and includes economic efficiency through the price system. Urban land use: land use and land values; pattern of urban land use; growth of urban land areas; quality of urban environment; housing, regional policy. The government and land resources: impact of government economic policy on land resources; theory of urban public finance; taxation and land resources; recent developments.

Real estate 120 (EWS 120)

Qualification	Undergraduate
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Module credits	8.00
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Programmes	BSc Real Estate
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Prerequisites	EWS 110
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Contact time	2 lectures per week
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Language of tuition	Module is presented in English
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Department	Construction Economics
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Period of presentation	Semester 2
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Module content

An introduction to property development which aims to develop an understanding of property development including: a study of the principles of property development including the relevant statutes and ordinances; urban development; control of land in South Africa; town planning; overview of property development. Development: timing and rate of development, redevelopment, public sector development, economics and planning controls, the construction industry.

Real estate 210 (EWS 210)

Qualification	Undergraduate
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Module credits	12.00
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Programmes	BSc Real Estate
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Prerequisites	EWS 110 and 120
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Contact time	4 lectures per week
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Language of tuition	Module is presented in English
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Department	Construction Economics
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Period of presentation	Semester 1
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Module content

An introduction to property management which aims to develop an understanding of the role of the property manager, functions of property management, the management contract, the owner/manager relationship. Maintenance of the long-term property acquisition/lease programme; purchase of land and buildings; leasing and insurance; law of leases, leasing non-owned premises; marketing and leasing of owned premises; lease management; management of residential, group housing, sectional title, office, shopping centre and industrial developments. Marketing of management services. The property cycle. Operational property/asset management. Financial control and budgets. Tenant relations. Risk management.

Real estate 220 (EWS 220)

Qualification	Undergraduate
Module credits	12.00
Programmes	BSc Real Estate
Prerequisites	EWS210, EKN110, EKN120
Contact time	4 lectures per week
Language of tuition	Module is presented in English
Department	Construction Economics
Period of presentation	Semester 2

Module content

An introduction to property economics which aims to develop an understanding of property economics. This includes property values, supply and demand, scarcity, diminishing returns, inflation, recession, fiscal and monetary policy, economic modelling. Utility value and productivity in property markets; economics constraints of property markets. Real estate supply and demand; price adjustments. Principles of property finance; urban finances, sources and forms of property finance. Taxation, income taxation, property taxation and value added tax.

Real estate 310 (EWS 310)

Qualification	Undergraduate
Module credits	12.00
Programmes	BSc Real Estate
Prerequisites	EWS 210, EWS 220
Contact time	3 lectures per week
Language of tuition	Separate classes for Afrikaans and English
Department	Construction Economics
Period of presentation	Semester 1

Module content

An introduction to property investment with the aim to develop an understanding of the nature and scope of investment. It includes the nature and scope of real estate investment, objectives of property investors, participants in the property investment process, the investment decision process, investment criteria, investment time horizons, decision-making approaches, different taxes applicable to property investment and development; asset classes; investment strategies; investment principles; investment lifecycle; Time value of money. Listed vehicles and REIT's. The international market and investment standards, international investment strategy and risk in international investments.

Real estate 320 (EWS 320)

Qualification	Undergraduate
Module credits	12.00
Programmes	BSc Real Estate
Prerequisites	EWS 310
Contact time	3 lectures per week
Language of tuition	Separate classes for Afrikaans and English
Department	Construction Economics
Period of presentation	Semester 2

Module content

The establishment of townships; types of dwelling units and housing types; principles of medium and high density residential development; development of sectional title and group housing; development of retirement centres; introduction to commercial property development; development of office buildings, parking garages, shopping centres, industrial parks; and rehabilitation and conversion of buildings; Green Building; Development life-cycle; risk assessment; management and marketing of property developments; environmental impact assessment.

Real estate 710 (EWS 710)

Qualification	Postgraduate
Module credits	16.00
Programmes	BScHons Real Estate
Prerequisites	No prerequisites.
Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	Construction Economics
Period of presentation	Semester 1

Module content

Property development with the aim to develop an understanding of the management of building design and construction. It includes general contracting, architectural design, specification of operating systems, upgrade programmes, estimating, preparation of contract, drawings and specifications, preparation of tender packages, tendering concept of marketing, marketing management; marketing management philosophies, marketing of residential properties; marketing of commercial and industrial properties. The purpose of the development manager. Commercial property finance. PPP's and joint ventures.

Real estate 711 (EWS 711)

Qualification	Postgraduate
Module credits	12.00
Programmes	BScHons Real Estate
Prerequisites	No prerequisites.
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Construction Economics
Period of presentation	Semester 1

Module content

An introduction to facilities management including the following: management of different types of facilities and portfolios of assets. Principles of outsourcing and the outsourcing decision. Contractual relationships in facilities- and asset management; management of building operations; operation of building operating systems; building maintenance and repairs; cleaning services; cost control and financial reporting. The service level agreement. Office facility planning: determining workplace area standards; specifying common facilities; programming short- and long-term office space needs; maintaining the office space inventory; and space allocation to individuals and user-groups. Strategic property/asset management. Relocation, maintenance management and life cycle costing; energy management, environmental issues. Outsourcing.

Real estate 720 (EWS 720)

Qualification	Postgraduate
Module credits	12.00
Programmes	BScHons Real Estate
Prerequisites	No prerequisites.
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Construction Economics
Period of presentation	Semester 2

Module content

Modern portfolio theory: portfolio risk and return; applied portfolio theory; index models; portfolio construction. Property Portfolio: compiling an efficient property portfolio; IPD and property data sources; trading properties; diversification strategies. The property component of institutional investor portfolios; the property listed sector including property unit trusts and property loan stocks; property market research and analysis; techniques for analysis of market data. Operational Property/Asset management.

Advanced literature study 789 (EXL 789)

Qualification	Postgraduate
Module credits	32.00
Prerequisites	No prerequisites.
Contact time	16 contact hours per semester
Language of tuition	Module is presented in English
Department	Electrical, Electronic and Computer Engineering
Period of presentation	Semester 1 or Semester 2

Module content

An advanced literature study on a specialised topic with the aim of solving a particular problem, to be determined in conjunction with a lecturer in the department. The aim of the study is not to merely summarize the contributions in the literature on a specific topic, but to gather, interpret and apply previously recorded knowledge to solve a particular problem.

The aim of the advanced literature study is to give masters students the opportunity to broaden their knowledge in a certain field. The topic of this study can be related, but is not restricted to the area of research for their dissertation. There must however, be a clear distinction between the outputs of the advanced literature study and that of the dissertation. The project for this course cannot form a subset of the dissertation. This course is problem driven and the aim should be to identify a problem, gather, interpret and apply previously recorded knowledge to solve a particular problem.

Facilities management 822 (FAM 822)

Qualification	Postgraduate
Module credits	10.00
Programmes	MSc Real Estate Retail Property (Coursework) MSc Real Estate (Coursework)
Prerequisites	No prerequisites.
Contact time	10 lectures per week
Language of tuition	Module is presented in English
Department	Construction Economics
Period of presentation	Semester 1

Financial management 110 (FBS 110)

Qualification	Undergraduate
Module credits	10.00
Programmes	BEng Industrial Engineering BEng Industrial Engineering ENGAGE BSc Construction Management BSc Mathematical Statistics BSc Quantity Surveying BSc Real Estate
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Natural and Agricultural Sciences
Prerequisites	No prerequisites.
Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	Financial Management
Period of presentation	Semester 1

Module content

*Only for BSc (Mathematical Statistics, Construction Management, Real Estate and Quantity Surveying) and BEng (Industrial Engineering) students.

Purpose and functioning of financial management. Basic financial management concepts. Accounting concepts and the use of the basic accounting equation to describe the financial position of a business. Recording of financial transactions. Relationship between cash and accounting profit. Internal control and the management of cash. Debtors and short-term investments. Stock valuation models. Depreciation. Financial statements of a business. Distinguishing characteristics of the different forms of businesses. Overview of financial markets and the role of financial institutions. Risk and return characteristics of various financial instruments. Issuing ordinary shares and debt instruments.

Financial management 210 (FBS 210)

Qualification	Undergraduate
Module credits	16.00
Programmes	BCom Financial Sciences BCom Law BSc Construction Management BSc Quantity Surveying BSc Real Estate
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	BCom Financial Sciences, Investment Management and Law: FRK111 and FRK121 (or FRK100 or 101), STK110, 120 or FBS121, and simultaneously registered for FRK211; BSc Construction Management, Quantity Surveying and Real Estate: FBS110, STK110 and STK161
Contact time	3 lectures per week

Language of tuition	Module is presented in English
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Department	Financial Management
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Period of presentation	Semester 1
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Module content

*Only for BCom (Financial Sciences, Investment Management and Law) and BSc (Construction Management , Quantity Surveying and Real Estate) students.

Framework and purpose of financial management; understanding financial statements; analysis of financial statements for decision making; time value of money; risk and return relationships; business valuation; short-term planning; current asset management.

Financial management 320 (FBS 320)

Qualification	Undergraduate
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Module credits	20.00
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Programmes	BCom Financial Sciences BCom Investment Management BCom Law
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Service modules	Faculty of Engineering, Built Environment and Information Technology
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Prerequisites	FBS 210 or BLB 200/IVM 200. Only available to 07130202, 07130203, 07130204, 07130071 and 07130151
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Contact time	3 lectures per week
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Language of tuition	Module is presented in English
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Department	Financial Management
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Period of presentation	Semester 2
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Module content

*Only for BCom (Financial Sciences, Investment Management, and Law) and BSs (Construction Management, Quantity Surveying and Reak Estate) students.

Cost of capital; determination of capital requirements and the financing of a business to maintain the optimal capital structure; the investment decision and the study of financial selection criteria in the evaluation of capital investment projects; impact of inflation and risk on capital investment decisions; evaluation of leasing decisions; dividend decisions; international financial management. Valuation principles and practices: an introduction to security analysis; hybrids and derivative instruments, mergers and acquisitions.

Financial management 361 (FBS 361)

Qualification	Undergraduate
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Module credits	10.00
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Programmes	BSc Construction Management BSc Quantity Surveying
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Prerequisites	FBS 210; only for BSc (Construction Management), BSc (Quantity Surveying) and BSc (Real Estate) students.
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Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	Financial Management
Period of presentation	Quarter 3

Module content

Cash flow calculations; the investment decision and the study of financial selection criteria in the evaluation of capital investment projects; the cost of capital; determination of capital requirements and the financing of a business to maintain the optimal capital structure.

Capita selecta in financial management 713 (FBS 713)

Qualification	Postgraduate
Module credits	12.00
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	FBS 310, FBS 320 or FBS 300 and IOK 311, IOK 321 or ODT 300 and FRK 311, FRK 321 or FRK 300
Language of tuition	Module is presented in English
Department	Financial Management
Period of presentation	Semester 1

Module content

Objectives of financial management; Risk and return; Required rate of return and the cost of capital; Valuation; Capital investment decisions; Financial analysis; Aspects of behavioural corporate finance.

Financial management 830 (FBS 830)

Qualification	Postgraduate
Module credits	10.00
Programmes	MEng Engineering Management (Coursework) MSc Engineering Management (Coursework)
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	No prerequisites.
Contact time	20 contact hours per semester
Language of tuition	Module is presented in English
Department	Financial Management
Period of presentation	Semester 1 or Semester 2

Module content

The aim of this module is to enhance engineering managers' understanding of Financial Management principles and its role in maximising the long term wealth of the shareholders and other stakeholders. Three major decisions are involved: Firstly, capital structure decisions relate to how long-term sources of finance such as debt and equity are combined in an optimal structure for the firm. Secondly, capital budgeting decisions relate to how these sources are optimally invested in for instance infrastructure and manufacturing assets. Thirdly, short-term decisions relate to the use of current assets and current liabilities in the best possible way.

Engineering managers need to understand how the results of these three types of decisions are reflected in the financial statements of the firm. Financial principles are important in assessing the financial health of a firm, be it private or public, large or small, profit-seeking or not-for-profit. A thorough understanding of these principles and how they interact from a risk-return perspective is crucial to best serve the strategic goals of the firm.

Financial management 831 (FBS 831)

Qualification	Postgraduate
Module credits	10.00
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Financial Management
Period of presentation	Semester 1

Module content

"The goal of a firm is to maximise the long-term wealth of its shareholders." Why do most management experts generally accept this statement? How do all the other objectives of a firm relate to this goal? Why is the success of most companies measured in financial terms? In FBS 831 answers to these questions are sought. The nature of and interaction between different financial statements are investigated, as well as their role in the creation of shareholder wealth. Although maximising shareholder wealth is the basic general cornerstone of management, recent developments point out that non-quantitative factors are also important in the measurement of company performance.

Property financial mathematics 320 (FBV 320)

Qualification	Undergraduate
Module credits	6.00
Prerequisites	No prerequisites.
Contact time	2 lectures per week
Language of tuition	Afrikaans and English are used in one class
Department	Construction Economics
Period of presentation	Semester 2

Module content

Application of the principles of interest calculations on the property industry; more specifically the time value of money, introduction to financial return techniques, net present values and internal rate of return.

Philosophy 110 (FIL 110)

Qualification	Undergraduate
Module credits	12.00
Programmes	BA BA Extended programme BA Fine Arts BA Languages BA Law BA Visual Studies BPolSci International Studies BPolSci Political Studies BSocSci Industrial Sociology and Labour Studies BSocSci Philosophy, Politics and Economics LLB
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Law
Prerequisites	No prerequisites.
Contact time	1 discussion class per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Philosophy
Period of presentation	Semester 1

Module content

Introduction to Philosophy

The two semester modules at first-year level introduce students to four main subfields of philosophy, namely metaphysics, epistemology, ontology and ethics. This module introduces students to two of these subfields, namely epistemology and metaphysics with reference to the work of a range of scholars from the Global South and the West. Students will become acquainted with the nature of philosophical reflection by exploring a number of classical philosophical themes in each subfield. Throughout the module there is an emphasis on developing those critical thinking, reading and writing skills that are required in Philosophy, while students become acquainted with the power of critique as critical judgment and discernment.

Philosophy 120 (FIL 120)

Qualification	Undergraduate
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Module credits	12.00
Programmes	BA BA Extended programme BA Fine Arts BA Languages BA Law BA Visual Studies BPolSci International Studies BPolSci Political Studies BSocSci Industrial Sociology and Labour Studies BSocSci Philosophy, Politics and Economics LLB
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Law
Prerequisites	No prerequisites.
Contact time	1 discussion class per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Philosophy
Period of presentation	Semester 2

Module content

Introduction to Philosophy

The two semester modules at first-year level introduce students to four main subfields of philosophy, namely metaphysics, epistemology, ontology and ethics. This module introduces students to two of these subfields, namely ontology and ethics and the emphasis is on texts by African and Western scholars. Students will become acquainted with the nature of philosophical reflection by exploring a number of classical philosophical themes in each subfield. Throughout the module there is an emphasis on developing those critical thinking, reading and writing skills that are required in Philosophy, while students become acquainted with the power of critique as critical judgment and discernment.

Contesting modernities I and II 210 (FIL 210)

Qualification	Undergraduate
Module credits	20.00
Programmes	BA BA Languages BA Law BA Visual Studies BPolSci International Studies BPolSci Political Studies BSocSci Industrial Sociology and Labour Studies BSocSci Philosophy, Politics and Economics
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	At least one of FIL 110, 120

Contact time	1 discussion class per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Philosophy
Period of presentation	Semester 1

Module content

This module engages the historical emergence of modern African philosophy in relation to the Western canon. The first module traces the history of modern western philosophy as the history of different conceptions of First Philosophy – from the claim that it is epistemology (Aristotle through eg. Kant and Hegel), to ontology (eg Heidegger), to the ethical (eg. Levinas) to the claim that it is the political (eg Grosfoguel, Mignolo). The second module traces the historical process through which the modern African subject is constituted in a struggle for recognition with reference to the work of theorists such as Hegel, Du Bois, Fanon and others.

Philosophy in context 220 (FIL 220)

Qualification	Undergraduate
Module credits	20.00
Programmes	BA BA Languages BA Law BA Visual Studies BPolSci International Studies BPolSci Political Studies BSocSci Industrial Sociology and Labour Studies BSocSci Philosophy, Politics and Economics
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	At least one of FIL 110, 120
Contact time	1 discussion class per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Philosophy
Period of presentation	Semester 2

Module content

In this module contextually relevant aspects of human reality are reflected on through philosophy considered as practical activity. Students will engage issues of socio-political relevance in contemporary (South) Africa, the Global South and beyond. The focus is on key themes and texts in debates of contemporary relevance and may include issues from any of the sub-disciplines of philosophy such as political philosophy, moral philosophy and philosophy of science.

Introduction to moral and political philosophy 251 (FIL 251)

Qualification	Undergraduate
Module credits	10.00

Programmes	BCom BCom Agribusiness Management BCom Economics BCom Financial Sciences BCom Human Resource Management BCom Informatics Information Systems BCom Statistics BCom Statistics and Data Science BIT Information Systems BSc Geoinformatics
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Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Economic and Management Sciences
Prerequisites	No prerequisites.
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Philosophy
Period of presentation	Quarter 2, 3 and 4

Module content

In this module students are equipped with an understanding of the moral issues influencing human agency in economic and political contexts. In particular philosophy equips students with analytical reasoning skills necessary to understand and solve complex moral problems related to economic and political decision making. We demonstrate to students how the biggest questions concerning the socio-economic aspects of our lives can be broken down and illuminated through reasoned debate. Examples of themes which may be covered in the module include justice and the common good, a moral consideration of the nature and role of economic markets on society, issues concerning justice and equality, and dilemmas of loyalty. The works of philosophers covered may for instance include that of Aristotle, Locke, Bentham, Mill, Kant, Rawls, Friedman, Nozick, Bernstein, Dworkin, Sandel, Walzer, and MacIntyre.

Self and subjectivity 310 (FIL 310)

Qualification	Undergraduate
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Module credits	30.00
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Programmes	BA BA Law BA Visual Studies BPolSci International Studies BPolSci Political Studies BSocSci Industrial Sociology and Labour Studies BSocSci Philosophy, Politics and Economics
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Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	At least three of FIL 110, 120, 210, 220
Contact time	1 discussion class per week, 2 lectures per week
Language of tuition	Separate classes for Afrikaans and English

Department	Philosophy
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Period of presentation	Semester 1
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Module content

In this module the focus is on understanding humankind and its relation to reality and knowledge. The focus of the module as a whole is philosophical anthropology or contemporary metaphysics, and it traces the development of the conceptions of 'self' and 'subjectivity' in any given philosophical tradition in Africa, the West or more generally the Global South by focussing on questions such as the relation between consciousness, self-consciousness and the human unconscious; the meaning of life; the nature of personal identity and the issue of free will.

Philosophy in context 320 (FIL 320)

Qualification	Undergraduate
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Module credits	30.00
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Programmes	BA BA Law BA Visual Studies BPolSci International Studies BPolSci Political Studies BSocSci Industrial Sociology and Labour Studies BSocSci Philosophy, Politics and Economics
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Service modules	Faculty of Engineering, Built Environment and Information Technology
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Prerequisites	FIL 110, 120, 210, 220 and 310
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Contact time	1 discussion class per week, 2 lectures per week
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Language of tuition	Separate classes for Afrikaans and English
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Department	Philosophy
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Period of presentation	Semester 2
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Module content

In this module students will philosophically engage issues of socio-political relevance in contemporary (South) Africa, the Global South and beyond. A range of themes may be investigated, such as structure and agency, social imaginaries, new social formations, institutional cultures, gender and sexuality, subject constitution, and others. These issues will be framed in a spectrum of approaches that may include Critical Theory, Theory of Ideology, Contractarianism, Social Action Theory, and Critical Race Theory.

Advanced corporate finance 701 (FIN 701)

Qualification	Postgraduate
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Module credits	30.00
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Programmes	BComHons Financial Management Sciences
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Service modules	Faculty of Engineering, Built Environment and Information Technology
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Prerequisites	FBS 320 or FBS 300 and FRK 311, FRK 321 or FRK 300
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Contact time	1 lecture per week
Language of tuition	Module is presented in English
Department	Financial Management
Period of presentation	Year

Module content

*Only for BComHons: Financial Management Sciences and Investment Management students.
 Objectives of financial management; Risk and return; Required rate of return and the cost of capital; Capital structure theory; Valuation; Capital investment decisions; Leasing; Dividend decision and long-term financing; Economic value added; Sustainable growth; Convertible bonds; Financial analysis; Financial planning and control; Mergers and acquisitions; Working capital management; Foreign trade and foreign exchange; International investments and International treasury; Aspects of behavioural corporate finance.

Financial management 700 (FMT 700)

Qualification	Postgraduate
Module credits	18.00
Prerequisites	No prerequisites.
Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	Construction Economics
Period of presentation	Year

Module content

Budget estimates, cash-flow schedules, financial statements and construction financial management calculations and accounting.

Financial management 701 (FMT 701)

Qualification	Postgraduate
Module credits	18.00
Prerequisites	FMT 700 GS
Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	Construction Economics
Period of presentation	Year

Module content

The application of management principles such as: cost, budgets, cash-flow and financial statements, in construction financial management and construction project management.

Construction finance 713 (FMT 713)

Qualification	Postgraduate
Module credits	10.00
Programmes	BScHons Construction Management
Prerequisites	No prerequisites.
Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	Construction Economics
Period of presentation	Semester 1

Module content

Construction project budgeting, estimating, analysing and interpreting cash flow schedules financial statements and construction financial management planning.

Financial accounting 111 (FRK 111)

Qualification	Undergraduate
Module credits	10.00

Programmes	BCom BCom Agribusiness Management BCom Business Management BCom Econometrics BCom Economics BCom Financial Sciences BCom Human Resource Management BCom Informatics Information Systems BCom Investment Management BCom Law BCom Marketing Management BCom Statistics BCom Statistics and Data Science BCom Supply Chain Management BConSci Clothing Retail Management BConSci Food Retail Management BConSci Hospitality Management BEd Senior Phase and Further Education and Training Teaching BIT Information Systems BSc Applied Mathematics BSc Extended programme - Biological and Agricultural Sciences BSc Extended programme - Mathematical Sciences BSc Mathematics BScAgric Agricultural Economics and Agribusiness Management LLB
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Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Law Faculty of Natural and Agricultural Sciences
Prerequisites	No prerequisites.
Contact time	4 lectures per week
Language of tuition	Module is presented in English
Department	Accounting
Period of presentation	Semester 1

Module content

The nature and function of accounting; the development of accounting; financial position; financial result; the recording process; processing of accounting data; treatment of VAT; elementary income statement and balance sheet; flow of documents; accounting systems; introduction to internal control and internal control measures; bank reconciliations; control accounts; adjustments; financial statements of a sole proprietorship; the accounting framework.

Financial accounting 121 (FRK 121)

Qualification	Undergraduate
Module credits	12.00

Programmes

[BCom](#)
[BCom Financial Sciences](#)
[BCom Informatics Information Systems](#)
[BCom Investment Management](#)
[BCom Law](#)
[BCom Statistics](#)
[BCom Statistics and Data Science](#)
[BEd Senior Phase and Further Education and Training Teaching](#)
[BIT Information Systems](#)
[BSc Extended programme - Biological and Agricultural Sciences](#)
[BScAgric Agricultural Economics and Agribusiness Management](#)

Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Natural and Agricultural Sciences
Prerequisites	FRK 111 GS
Contact time	4 lectures per week
Language of tuition	Module is presented in English
Department	Accounting
Period of presentation	Semester 2

Module content

Property, plant and equipment; intangible assets; inventories; liabilities; presentation of financial statements; enterprises without profit motive; partnerships; companies; close corporations; cash flow statements; analysis and interpretation of financial statements.

Financial accounting 122 (FRK 122)

Qualification Undergraduate

Module credits 12.00

Programmes

BCom
BCom Agribusiness Management
BCom Business Management
BCom Econometrics
BCom Economics
BCom Human Resource Management
BCom Informatics Information Systems
BCom Law
BCom Marketing Management
BCom Statistics
BCom Statistics and Data Science
BCom Supply Chain Management
BConSci Clothing Retail Management
BConSci Food Retail Management
BConSci Hospitality Management
BIT Information Systems
BSc Information and Knowledge Systems
LLB

Service modules Faculty of Engineering, Built Environment and Information Technology
Faculty of Law
Faculty of Natural and Agricultural Sciences

Prerequisites FRK 111 GS or FRK 133, FRK 143

Contact time 4 lectures per week

Language of tuition Module is presented in English

Department Accounting

Period of presentation Semester 2

Module content

Budgeting, payroll accounting, taxation – income tax and an introduction to other types of taxes, credit and the new Credit Act, insurance, accounting for inventories (focus on inventory and the accounting entries, not calculations), interpretation of financial statements.

Financial accounting 211 (FRK 211)

Qualification Undergraduate

Module credits 16.00

Programmes	BCom BCom Financial Sciences BCom Informatics Information Systems BCom Investment Management BCom Law BCom Statistics BCom Statistics and Data Science BEd Senior Phase and Further Education and Training Teaching BIT Information Systems
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education
Prerequisites	FRK 111 and FRK 121 or FRK 100/101
Contact time	4 lectures per week
Language of tuition	Module is presented in English
Department	Accounting
Period of presentation	Semester 1

Module content

Preparation and presentation of company annual financial statements in compliance with the requirements of the Companies Act, the Framework and Statements of Generally Accepted Accounting Practice relating to the following: presentation of financial statements; revenue; investments; provisions, contingent liabilities and contingent assets; events after the balance sheet date; inventories; income taxes; leases; property, plant and equipment; impairment of assets; intangible assets; investment property, changes in accounting estimates and errors; introduction to financial instruments.

Financial accounting 221 (FRK 221)

Qualification	Undergraduate
Module credits	16.00
Programmes	BCom BCom Financial Sciences BCom Informatics Information Systems BCom Investment Management BCom Law BCom Statistics BCom Statistics and Data Science BEd Senior Phase and Further Education and Training Teaching BIT Information Systems
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education
Prerequisites	FRK 211 GS
Contact time	4 lectures per week
Language of tuition	Module is presented in English

Department	Accounting
Period of presentation	Semester 2

Module content

Preparation and presentation of company annual financial statements in compliance with the requirements of Statements of Generally Accepted Accounting Practice relating to the following: employee benefits; the effects of changes in foreign exchange rates; accounting policies; earnings per share; cash flow statements; interests in joint ventures. Branch accounting. Introduction to consolidations, including basic consolidation techniques for both wholly-owned and partly-owned subsidiaries. Introduction to public sector accounting.

Financial accounting 311 (FRK 311)

Qualification	Undergraduate
Module credits	20.00

Programmes	BCom BCom Financial Sciences BCom Informatics Information Systems BCom Investment Management BCom Law BCom Statistics BCom Statistics and Data Science
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Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	FRK 211, 221 and INF 281
Contact time	4 lectures per week
Language of tuition	Module is presented in English

Department	Accounting
Period of presentation	Semester 1

Module content

Preparation and presentation of company annual financial statements in compliance with the requirements of International Financial Reporting Standards (IFRS) relating to the following: income taxes; property, plant and equipment; impairment; non-current assets held for sale; intangible assets; investment property; borrowing costs; leases; accounting policies; changes in accounting estimates and errors; segment reporting; certain aspects of financial instruments.

Financial accounting 321 (FRK 321)

Qualification	Undergraduate
Module credits	20.00

Programmes	BCom BCom Financial Sciences BCom Informatics Information Systems BCom Investment Management BCom Law BCom Statistics BCom Statistics and Data Science
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Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	FRK 311 GS and INF 281
Contact time	4 lectures per week
Language of tuition	Module is presented in English
Department	Accounting
Period of presentation	Semester 2

Module content

Preparation and presentation of company annual financial statements in compliance with the requirements of International Financial Reporting Standards (IFRS) relating to the following: the effects of changes in foreign exchange rates; earnings per share; related party disclosure; associates. Complex consolidation issues, including intra-group transactions; dividends; preference shares; revaluations; horizontal, vertical and mixed groups; insolvent subsidiaries; change of interest; consolidated cash flow statement.

French: Cultural-professional (1) 113 (FRN 113)

Qualification	Undergraduate
Module credits	12.00
Programmes	BIS Publishing
Service modules	Faculty of Health Sciences
Prerequisites	Grade 12 French
Contact time	1 discussion class per week, 2 lectures per week
Language of tuition	Module is presented in English and French
Department	Ancient and Modern Languages and Cultures
Period of presentation	Semester 1

Module content

Comprehensive review of French grammar; development of reading, writing, speaking and understanding skills; analysis and interpretation of texts.

French: Cultural-professional (2) 123 (FRN 123)

Qualification	Undergraduate
Module credits	12.00
Programmes	BIS Publishing

Service modules	Faculty of Health Sciences
Prerequisites	FRN 113
Contact time	1 discussion class per week, 2 lectures per week
Language of tuition	Module is presented in English and French
Department	Ancient and Modern Languages and Cultures
Period of presentation	Semester 2

Module content

Comprehensive review of French grammar; further development of reading, writing, speaking and understanding skills; analysis and interpretation of texts.

French: Intermediate (1) 211 (FRN 211)

Qualification	Undergraduate
Module credits	20.00
Programmes	BIS Publishing
Prerequisites	FRN 104 or FRN 123
Contact time	1 lecture per week, 4 discussion classes per week
Language of tuition	Module is presented in English and French
Department	Ancient and Modern Languages and Cultures
Period of presentation	Semester 1

Module content

This module focuses on the further development of communication skills with special emphasis on the receptive activities of the language, namely listening and reading. Careful attention is given to critical aspects of French grammar. Short fictional and non-fictional texts are used for comprehension as well as for demonstrating cultural aspects of the French-speaking countries. This module complies with the requirements for level B1.1 set by the “Common European Framework of Reference for Languages”.

French: Intermediate (2) 221 (FRN 221)

Qualification	Undergraduate
Module credits	20.00
Programmes	BIS Publishing
Prerequisites	FRN 211
Contact time	1 lecture per week, 4 discussion classes per week
Language of tuition	Module is presented in English and French
Department	Ancient and Modern Languages and Cultures
Period of presentation	Semester 2

Module content

This module continues with the development of communicative skills of the language. Special attention is given to the comprehension of non-fictional and literary written texts, spoken and audio-visual inputs, as well as the application of knowledge of French grammar in oral and written production. This module complies with the requirements for level B1.2 set by the “Common European Framework of Reference for Languages”.

French: Cultural-professional (7) 361 (FRN 361)

Qualification	Undergraduate
Module credits	15.00
Programmes	BIS Publishing
Prerequisites	FRN 221 or FRN 261, 262, 263 and 264 (before 2011)
Contact time	2 discussion classes per week
Language of tuition	Module is presented in French
Department	Ancient and Modern Languages and Cultures
Period of presentation	Semester 1

Module content

Principles of textual grammar of the French language. This module complies with the requirements for level B2.1 set by the “Common European Framework of Reference for Languages”.

French: Cultural-professional (8) 362 (FRN 362)

Qualification	Undergraduate
Module credits	15.00
Programmes	BIS Publishing
Prerequisites	FRN 221 or FRN 261, 262, 263 and 264 (before 2011)
Contact time	1 lecture per week, 2 discussion classes per week
Language of tuition	Module is presented in French
Department	Ancient and Modern Languages and Cultures
Period of presentation	Semester 1

Module content

Analysis, interpretation and appropriation of relevant audio-visual material and texts from non-fictional and fictional sources.

This module complies with the requirements for level B2.1 set by the “Common European Framework of Reference for Languages”.

French: Cultural-professional (9) 363 (FRN 363)

Qualification	Undergraduate
Module credits	15.00

Programmes	BIS Publishing
Prerequisites	FRN 361
Contact time	1 practical per week, 2 discussion classes per week
Language of tuition	Module is presented in French
Department	Ancient and Modern Languages and Cultures
Period of presentation	Semester 2

Module content

Principles of grammar of the French language. Introduction to professional translation and interpreting for the purpose of learning French as a foreign language.

French: Cultural-professional (10) 364 (FRN 364)

Qualification	Undergraduate
Module credits	15.00
Programmes	BIS Publishing
Prerequisites	FRN 362
Contact time	2 discussion classes per week, 2 lectures per week
Language of tuition	Module is presented in French
Department	Ancient and Modern Languages and Cultures
Period of presentation	Semester 2

Module content

Analysis, interpretation and appropriation of literary texts in cultural-historical perspective.

Physics 116 (FSK 116)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Chemical Engineering BEng Computer Engineering BEng Computer Engineering ENGAGE BEng Industrial Engineering BEng Industrial Engineering ENGAGE BEng Mechanical Engineering BEng Mechanical Engineering ENGAGE
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	No prerequisites.
Contact time	1 discussion class per week, 1 practical per week, 4 lectures per week
Language of tuition	Module is presented in English
Department	Physics

Period of presentation Semester 1

Module content

Introductory mathematics: Symbols, exponents, logarithms, angles in degrees, radial measure, goniometry, differentiation, and integration. Motion along a straight line: position and displacement, acceleration. Vectors: adding vectors, components, multiplying vectors. Motion in two and three dimensions: projectile motion, circular motion. Force and motion: Newton's Law, force, friction. Kinetic energy and work: work, power. Potential energy: Centre of mass, linear momentum. Collisions: impulse and linear momentum, elastic collisions, inelastic collisions. Rotation: kinetic energy of rotation, torque. Oscillations and waves: Simple harmonic motion, types of waves, wavelength and frequency, interference of waves, standing waves, the Doppler effect. Temperature, heat and the first law of thermodynamics.

Physics 176 (FSK 176)

Qualification Undergraduate

Module credits 16.00

Programmes

BEng Chemical Engineering ENGAGE
BEng Civil Engineering
BEng Civil Engineering ENGAGE
BEng Electrical Engineering
BEng Electrical Engineering ENGAGE
BEng Electronic Engineering
BEng Electronic Engineering ENGAGE
BEng Metallurgical Engineering
BEng Metallurgical Engineering ENGAGE
BEng Mining Engineering
BEng Mining Engineering ENGAGE

Service modules Faculty of Engineering, Built Environment and Information Technology

Prerequisites No prerequisites.

Contact time 1 discussion class per week, 1 practical per week, 4 lectures per week

Language of tuition Module is presented in English

Department Physics

Period of presentation Semester 2

Module content

Introductory mathematics: Symbols, exponents, logarithms, angles in degrees, radial measure, goniometry, differentiation, and integration. Motion along a straight line: position and displacement, acceleration. Vectors: adding vectors, components, multiplying vectors. Motion in two and three dimensions: projectile motion, circular motion. Force and motion: Newton's Law, force, friction. Kinetic energy and work: work, power. Potential energy: Centre of mass, linear momentum. Collisions: impulse and linear momentum, elastic collisions, inelastic collisions. Rotation: kinetic energy of rotation, torque. Oscillations and waves: Simple harmonic motion, types of waves, wavelength and frequency, interference of waves, standing waves, the Doppler effect. Temperature, heat and the first law of thermodynamics.

Building services 112 (GBD 112)

Qualification	Undergraduate
Module credits	6.00
Programmes	BSc Construction Management BSc Quantity Surveying BSc Real Estate
Prerequisites	No prerequisites.
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Construction Economics
Period of presentation	Semester 1

Module content

Sanitary services; soil and waste drainage for simple, multi-storey and multi-purpose buildings; local sewage by-laws; construction of all types of sewage and sanitary fittings.

Building services 122 (GBD 122)

Qualification	Undergraduate
Module credits	6.00
Programmes	BSc Construction Management BSc Quantity Surveying BSc Real Estate
Prerequisites	No prerequisites.
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Construction Economics
Period of presentation	Semester 2

Module content

Sanitary services; hot and cold-water supply to simple and multi-storey buildings; local by-laws; water reticulation to town development; different hot-water systems; water purification systems; water and energy saving.

Building services 211 (GBD 211)

Qualification	Undergraduate
Module credits	6.00
Programmes	BSc Construction Management BSc Quantity Surveying BSc Real Estate
Prerequisites	No prerequisites.

Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Construction Economics
Period of presentation	Semester 1

Module content

Introduction to the principles of indoor comfort. Heating, ventilation and air-conditioning systems. Installation and operation of lifts and other mechanical services. Fire detection and protection.

Building services 221 (GBD 221)

Qualification	Undergraduate
Module credits	6.00
Programmes	BSc Construction Management BSc Quantity Surveying BSc Real Estate

Prerequisites	No prerequisites.
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Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Construction Economics
Period of presentation	Semester 2

Module content

Theory of electricity; regulations of electricity-supply authorities; electrical installations; distribution of electricity.

Building services 222 (GBD 222)

Qualification	Undergraduate
Module credits	6.00
Prerequisites	No prerequisites.
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Construction Economics
Period of presentation	Semester 2

Module content

Installation and operation of lifts and other mechanical services; cleaning and waste disposal systems; industrial kitchens and cold rooms; fire detection and protection; building access control systems; building management systems.

Building services 311 (GBD 311)

Qualification Undergraduate

Module credits 6.00

Programmes BSc Construction Management
BSc Quantity Surveying
BSc Real Estate

Prerequisites GBD 221

Contact time 2 lectures per week

Language of tuition Afrikaans and English are used in one class

Department Construction Economics

Period of presentation Semester 1

Module content

Principles of illumination; illumination installations; lightning security; security systems; communication systems. Multimedia installations.

Building services preparatory 600 (GBD 600)

Qualification Postgraduate

Module credits 1.00

Prerequisites No prerequisites.

Contact time 8 other contact sessions per week

Language of tuition Module is presented in English

Department Construction Economics

Period of presentation Semester 1 or Semester 2

Aspects of human geography 156 (GGY 156)

Qualification Undergraduate

Module credits 8.00

Programmes	BA
	BA Extended programme
	BA Languages
	BEd Intermediate Phase Teaching
	BEd Senior Phase and Further Education and Training Teaching
	BIT Information Systems
	BPolSci International Studies
	BSc Chemistry
	BSc Computer Science
	BSc Environmental Sciences
	BSc Extended programme - Physical Sciences
	BSc Geography
	BSc Geoinformatics
	BSc Information and Knowledge Systems
	BSc Meteorology
	BSocSci Heritage and Cultural Tourism

Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Humanities Faculty of Health Sciences
Prerequisites	No prerequisites.
Contact time	1 tutorial per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Geography Geoinformatics and Meteorology
Period of presentation	Quarter 2

Module content

This module begins by fostering an understanding of human geography. Then follows with the political ordering of space; cultural diversity as well as ethnic geography globally and locally; population geography of the world and South Africa: and four economic levels of development. The purpose is to place South Africa in a world setting and to understand the future of the country.

Southern African geomorphology 166 (GGY 166)

Qualification	Undergraduate
Module credits	8.00

Programmes	BA
	BA Extended programme
	BA Languages
	BEd Intermediate Phase Teaching
	BEd Senior Phase and Further Education and Training Teaching
	BPolSci International Studies
	BSc Chemistry
	BSc Computer Science
	BSc Environmental Sciences
	BSc Extended programme - Physical Sciences
	BSc Geography
	BSc Geoinformatics
	BSc Information and Knowledge Systems
	BSc Meteorology
	BSocSci Heritage and Cultural Tourism

Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Humanities Faculty of Health Sciences
Prerequisites	No prerequisites.
Contact time	1 tutorial per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Geography Geoinformatics and Meteorology
Period of presentation	Quarter 3

Module content

Investigating southern African landscapes and placing them in a theoretical and global context. The geomorphological evolution of southern Africa. Introduction to the concepts of Geomorphology and its relationships with other physical sciences (e.g. meteorology, climatology, geology, hydrology and biology). The processes and controls of landform and landscape evolution. Tutorial exercises cover basic techniques of geomorphological analysis, and topical issues in Geomorphology.

Geomorphology of the built environment 265 (GGY 265)

Qualification	Undergraduate
Module credits	12.00
Programmes	BSc Architecture BSc Landscape Architecture BSc Physics
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	No prerequisites.
Contact time	4 lectures per week
Language of tuition	Module is presented in English
Department	Geography Geoinformatics and Meteorology

Period of presentation Quarter 3

Module content

*This module is for Architecture and Landscape Architecture students only.

The theory component covers geomorphological aspects of the built environment including landscape identification; weathering or deterioration of natural stone and application to design and preservation of buildings and monuments; slope hydrology and stability conditions; soil erosion processes and construction impacts; drainage modification in urban areas; wetland identification, human impacts and rehabilitation; recreational impacts and management. In addition to the theory a field-based project is undertaken.

Introductory geographic information systems 283 (GGY 283)

Qualification Undergraduate

Module credits 14.00

Programmes [BIT Information Systems](#)
[BSc Chemistry](#)
[BSc Environmental Sciences](#)
[BSc Geography](#)
[BSc Geoinformatics](#)
[BSc Geology](#)
[BSc Information and Knowledge Systems](#)
[BSc Meteorology](#)

Service modules Faculty of Engineering, Built Environment and Information Technology
Faculty of Education
Faculty of Humanities

Prerequisites GMC 110

Contact time 1 practical per week, 2 lectures per week

Language of tuition Module is presented in English

Department Geography Geoinformatics and Meteorology

Period of presentation Semester 1

Module content

Introduction to Geographic Information Systems (GIS), theoretical concepts and applications of GIS. The focus will be on the GIS process of data input, data analysis, data output and associated technologies. This module provides the foundations for more advanced GIS and Geoinformatics topics. Practical assessments and a mini-project make use of South African and African examples and foster learning and application of concepts aligned to the UN Sustainable Development Goals.

Geographic data analysis 220 (GIS 220)

Qualification Undergraduate

Module credits 14.00

Programmes	BIT Information Systems
	BSc Chemistry
	BSc Engineering and Environmental Geology
	BSc Environmental Sciences
	BSc Geography
	BSc Geoinformatics
	BSc Information and Knowledge Systems
	BSc Meteorology
	BSc Physics

Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	GMC 110 and (STK 110 OR BME 120)
Contact time	1 practical per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Geography Geoinformatics and Meteorology
Period of presentation	Semester 2

Module content

The nature of geographical data and measurement.Application of statistics in the geographical domain. Probability, probability distributions and densities, expected values and variances, Central Limit theorem. Sampling techniques. Exploratory data analysis, descriptive statistics, statistical estimation, hypothesis testing, correlation analysis and regression analysis. Examples used throughout the course are drawn from South African and African case studies and taught within the framework of the UN Sustainable Development Goals.

Geographic information systems 310 (GIS 310)

Qualification	Undergraduate
Module credits	22.00
Programmes	BIT Information Systems
	BSc Chemistry
	BSc Environmental Sciences
	BSc Geography
	BSc Geoinformatics
	BSc Geology
	BSc Information and Knowledge Systems
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	GGY 283
Contact time	1 practical per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Geography Geoinformatics and Meteorology
Period of presentation	Semester 1

Module content

Advanced theory and practice of Geographic Information Systems; GIS applications; design and implementation of GIS applications. A project or assignments of at least 64 notional hours. Diverse South African examples will be used to expose the students to various data sources, geospatial analyses, and data representation to support the UN Sustainable Development Goals.

Spatial analysis 320 (GIS 320)

Qualification	Undergraduate
Module credits	22.00
Programmes	BIT Information Systems BSc Chemistry BSc Environmental Sciences BSc Geography BSc Geoinformatics BSc Geology BSc Information and Knowledge Systems BSc Meteorology
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	GIS 220 and GGY 283
Contact time	1 practical per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Geography Geoinformatics and Meteorology
Period of presentation	Semester 2

Module content

Construction of Raster Geovisualisations, spatial model construction and use, multi-criteria decision analysis. Factor analysis: Principle component analysis. Geostatistics: Spatial dependence modelling, ordinary kriging. Markov chains and cellular Automata, combined models. Examples using data from South Africa are implemented. A project or assignment of at least 64 notional hours.

Introductory soil science 250 (GKD 250)

Qualification	Undergraduate
Module credits	12.00

Programmes	BSc Biotechnology
	BSc Chemistry
	BSc Ecology
	BSc Engineering and Environmental Geology
	BSc Environmental Sciences
	BSc Geography
	BSc Geology
	BSc Landscape Architecture
	BSc Meteorology
	BSc Plant Science
	BSc Zoology
	BScAgric Agricultural Economics and Agribusiness Management
	BScAgric Animal Science
	BScAgric Applied Plant and Soil Sciences
	BScAgric Plant Pathology

Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	CMY 117 GS
Contact time	1 practical per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Department of Plant and Soil Sciences
Period of presentation	Semester 1

Module content

Origin and development of soil, weathering and soil formation processes. Profile differentiation and morphology. Physical characteristics: texture, structure, soil water, atmosphere and temperature. Chemical characteristics: clay minerals, ion exchange, pH, buffer action, soil acidification and salinisation of soil. Soil fertility and fertilisation. Soil classification. Practical work: Laboratory evaluation of simple soil characteristics. Field practicals on soil formation in the Pretoria area.

Introduction to geology 155 (GLY 155)

Qualification	Undergraduate
Module credits	16.00

Programmes	BSc Computer Science
	BSc Engineering and Environmental Geology
	BSc Extended programme - Physical Sciences
	BSc Geography
	BSc Geology
	BSc Meteorology
	BSc Physics

Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	A candidate must have passed Mathematics with at least 60% in the Grade 12 examination.
Contact time	1 practical per week, 4 lectures per week

Language of tuition	Module is presented in English
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Department	Geology
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Period of presentation	Semester 1
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Module content

Solar system; structure of solid matter; minerals and rocks; introduction to symmetry and crystallography; important minerals and solid solutions; rock cycle; classification of rocks. External geological processes (gravity, water, wind, sea, ice) and their products (including geomorphology). Internal structure of the earth. The dynamic earth – volcanism, earthquakes, mountain building – the theory of plate tectonics. Geological processes (magmatism, metamorphism, sedimentology, structural geology) in a plate tectonic context. Geological maps and mineral and rock specimens. Interaction between man and the environment, and nature of anthropogenic climate change.

Earth history 163 (GLY 163)

Qualification	Undergraduate
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Module credits	16.00
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Programmes	BSc Computer Science
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Prerequisites	GLY 155
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Contact time	1 practical per week, 4 lectures per week
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Language of tuition	Module is presented in English
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Department	Geology
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Period of presentation	Semester 2
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Module content

This module will give an overview of earth history, from the Archaean to the present. Important concepts such as the principles of stratigraphy and stratigraphic nomenclature, geological dating and international and South African time scales will be introduced. A brief introduction to the principles of palaeontology will be given, along with short descriptions of major fossil groups, fossil forms, ecology and geological meaning. In the South African context, the major stratigraphic units, intrusions and tectonic/metamorphic events will be detailed, along with related rock types, fossil contents, genesis and economic commodities. Anthropogenic effects on the environment and their mitigation. Practical work will focus on the interpretation of geological maps and profiles.

Geology for engineering 256 (GLY 256)

Qualification	Undergraduate
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Module credits	16.00
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Programmes	BEng Civil Engineering BEng Civil Engineering ENGAGE BEng Mining Engineering BEng Mining Engineering ENGAGE
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Prerequisites	Only for BEng Mining Engineering and BEng Civil Engineering students.
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Contact time	1 practical per week, 4 lectures per week
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Language of tuition	Module is presented in English
Department	Geology
Period of presentation	Semester 1

Module content

This module is given to Mining and Civil Engineering students, focused on the practical application of basic geological principles to engineering problems. The course covers basic rock identification, principles of stratigraphy and landscape formation, and engineering applications of geology such as mining, slope stability, and civil applications. Practicals cover geological maps and profiles, as well as basic rock identification.

Geodynamics and ore formation 352 (GLY 352)

Qualification	Undergraduate
Module credits	18.00
Programmes	BEng Mining Engineering BEng Mining Engineering ENGAGE
Prerequisites	GLY 256
Contact time	2 practicals per week, 4 lectures per week
Language of tuition	Module is presented in English
Department	Geology
Period of presentation	Quarter 3

Module content

This module is offered to mining engineering students, and addresses the processes that formed mineral deposits, and the geological approach to exploiting such deposits. The module covers the principles of ore-forming processes and geological environments of ore formation, ore classification schemes, the geometry and geostatistical evaluation of ore bodies, the principles of rock deformation, stress, strain and rheology, joints, fault systems, folds and interference folding, tectonic fabrics, shear zones, and progressive deformation. The practicals cover the identification and classification of ore deposits, and the recognition and mitigation of geologically related mining hazards such as faults, shears and folding.

Remote sensing 220 (GMA 220)

Qualification	Undergraduate
Module credits	14.00
Programmes	BIT Information Systems BSc Environmental Sciences BSc Geography BSc Geoinformatics BSc Geology BSc Information and Knowledge Systems BSc Meteorology BSc Physics
Service modules	Faculty of Engineering, Built Environment and Information Technology

Prerequisites	GMC 110
Contact time	1 practical per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Geography Geoinformatics and Meteorology
Period of presentation	Semester 1

Module content

This module aims to provide students with a working knowledge and skills to learn methods and techniques for collecting, processing and analysing remotely sensed data. Throughout the module, emphasis will be placed on image processing, image analysis, image classification, remote sensing and applications of remote sensing in geographical analysis and environmental monitoring. The module is composed of lectures, readings, practical exercises research tasks and a project or assignments of at least 64 notional hours. In particular, the practical exercises and research tasks incorporate South African examples using satellite remotely-sensed data, as well as field spectral data measurements, to promote understanding of the state of land cover and land use types (e.g. spanning agricultural resources, water resources, urbanization) and how changes over time could impact on the changing climate in accordance with the United Nation's Sustainable Development Goals.

Cartography 110 (GMC 110)

Qualification	Undergraduate
Module credits	10.00
Programmes	BIT Information Systems BSc Chemistry BSc Computer Science BSc Environmental Sciences BSc Extended programme - Physical Sciences BSc Geography BSc Geoinformatics BSc Information and Knowledge Systems BSc Meteorology
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	No prerequisites.
Contact time	1 practical per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Geography Geoinformatics and Meteorology
Period of presentation	Semester 2

Module content

History, present and future of cartography. Introductory geodesy: shape of the earth, graticule and grids, datum definition, elementary map projection theory, spherical calculations. Representation of geographical data on maps: Cartographic design, cartographic abstraction, levels of measurement and visual variables. Semiotics for cartography: signs, sign systems, map semantics and syntactics, explicit and implicit meaning of maps (map pragmatics). Critique maps of indicators to measure United Nations Sustainable Development Goals in South Africa.

Mineralogy 210 (GMI 210)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Metallurgical Engineering BEng Metallurgical Engineering ENGAGE
Prerequisites	No prerequisites.
Contact time	2 tutorials per week, 4 lectures per week
Language of tuition	Module is presented in English
Department	Materials Science and Metallurgical Engineering
Period of presentation	Semester 1

Module content

Crystallography and internal order in minerals (space groups, unit cells, X-ray diffraction data). Bonding, mineral chemistry and solid solution (types of solid solution, calculation of mineral formulae and cation valency). Subsolidus reactions and defects in minerals (thermodynamic basis, defects, importance of subsolidus reactions). Classification and crystal structures of minerals. Mineralogical instrumentation and analysis. Major rock types and their classification. Mineralogical aspects of minerals processing.

Introductory genetics 161 (GTS 161)

Qualification	Undergraduate
Module credits	8.00

Programmes

- BEd Senior Phase and Further Education and Training Teaching
- BSc Biochemistry
- BSc Biological Sciences
- BSc Biotechnology
- BSc Chemistry
- BSc Ecology
- BSc Entomology
- BSc Extended programme - Biological and Agricultural Sciences
- BSc Food Science
- BSc Genetics
- BSc Human Genetics
- BSc Human Physiology
- BSc Human Physiology, Genetics and Psychology
- BSc Information and Knowledge Systems
- BSc Medical Sciences
- BSc Microbiology
- BSc Nutrition
- BSc Physics
- BSc Plant Science
- BSc Zoology
- BScAgric Agricultural Economics and Agribusiness Management
- BScAgric Animal Science
- BScAgric Applied Plant and Soil Sciences
- BScAgric Plant Pathology
- BVSc

Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Veterinary Science
Prerequisites	MLB 111 GS
Contact time	2 lectures per week, fortnightly tutorials
Language of tuition	Module is presented in English
Department	Biochemistry, Genetics and Microbiology
Period of presentation	Semester 2

Module content

Chromosomes and cell division. Principles of Mendelian inheritance: locus and alleles, dominance interactions, extensions and modifications of basic principles.. Probability studies. Sex determination and sex linked traits. Pedigree analysis. Genetic linkage and chromosome mapping. Chromosome variation.

Molecular genetics 251 (GTS 251)

Qualification	Undergraduate
Module credits	12.00

Programmes	BSc Biochemistry
	BSc Biotechnology
	BSc Chemistry
	BSc Ecology
	BSc Entomology
	BSc Food Science
	BSc Genetics
	BSc Human Genetics
	BSc Human Physiology
	BSc Human Physiology, Genetics and Psychology
	BSc Information and Knowledge Systems
	BSc Medical Sciences
	BSc Microbiology
	BSc Plant Science
	BSc Zoology
	BScAgric Animal Science
	BScAgric Applied Plant and Soil Sciences
	BScAgric Plant Pathology

Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education
Prerequisites	GTS 161 GS
Contact time	2 lectures per week, fortnightly tutorials
Language of tuition	Module is presented in English
Department	Biochemistry, Genetics and Microbiology
Period of presentation	Semester 1

Module content

The chemical nature of DNA. The processes of DNA replication, transcription, RNA processing, translation. Control of gene expression in prokaryotes and eukaryotes. Recombinant DNA technology and its applications in gene analysis and manipulation.

Genetic diversity and evolution 261 (GTS 261)

Qualification	Undergraduate
Module credits	12.00

Programmes	BSc Biochemistry
	BSc Biotechnology
	BSc Chemistry
	BSc Ecology
	BSc Entomology
	BSc Food Science
	BSc Genetics
	BSc Human Genetics
	BSc Human Physiology
	BSc Human Physiology, Genetics and Psychology
	BSc Information and Knowledge Systems
	BSc Medical Sciences
	BSc Microbiology
	BSc Plant Science
	BSc Zoology
	BScAgric Animal Science
	BScAgric Applied Plant and Soil Sciences
	BScAgric Plant Pathology

Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education
Prerequisites	GTS 251 GS
Contact time	2 lectures per week, fortnightly tutorials
Language of tuition	Module is presented in English
Department	Biochemistry, Genetics and Microbiology
Period of presentation	Semester 2

Module content

Chromosome structure and transposable elements. Mutation and DNA repair. Genomics and proteomics. Organelle genomes. Introduction to genetic analysis of populations: allele and genotypic frequencies, Hardy Weinberg Law, its extensions and implications for different mating systems. Introduction to quantitative and evolutionary genetics.

Genome evolution and phylogenetics 354 (GTS 354)

Qualification	Undergraduate
Module credits	18.00

Programmes	BSc Biochemistry
	BSc Biotechnology
	BSc Genetics
	BSc Human Genetics
	BSc Human Physiology
	BSc Human Physiology, Genetics and Psychology
	BSc Information and Knowledge Systems
	BSc Medical Sciences
	BSc Microbiology
	BSc Plant Science
	BSc Zoology

Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	GTS 251 GS and GTS 261 GS
Contact time	1 practical/tutorial per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Biochemistry, Genetics and Microbiology
Period of presentation	Semester 1

Module content

Mechanisms involved in the evolution of genes, genomes and phenotypes. Comparison of the molecular organisation of viral, archaea, bacterial and eukaryotic genomes. Genome project design, DNA sequencing methods and annotation. Molecular evolution. Phylogenetic inference. Applications of phylogenetics and evolutionary genomics research, including relevance to sustainable development goals for food security, good health and the biosphere.

Population and evolutionary genetics 367 (GTS 367)

Qualification	Undergraduate
Module credits	18.00

Programmes

[BSc Biochemistry](#)
[BSc Biotechnology](#)
[BSc Genetics](#)
[BSc Human Genetics](#)
[BSc Human Physiology](#)
[BSc Information and Knowledge Systems](#)
[BSc Medical Sciences](#)
[BSc Microbiology](#)
[BSc Plant Science](#)

Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	GTS 251 and GTS 261 GS.
Contact time	1 practical/tutorial per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Biochemistry, Genetics and Microbiology
Period of presentation	Semester 2

Module content

Genetic and phenotypic variation. Organisation of genetic variation. Random genetic drift. Mutation and the neutral theory. Darwinian selection. Inbreeding, population subdivision and migration. Evolutionary quantitative genetics. Population genomics. Human population genetics. Levels of selection and individuality. Arms races and irreversibility. Complexity. Applied evolution.

Humanities and social sciences 110 (HAS 110)

Qualification	Undergraduate
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Module credits	8.00
Programmes	BEng Chemical Engineering BEng Chemical Engineering ENGAGE BEng Civil Engineering BEng Civil Engineering ENGAGE BEng Computer Engineering BEng Computer Engineering ENGAGE BEng Electrical Engineering BEng Electrical Engineering ENGAGE BEng Electronic Engineering BEng Electronic Engineering ENGAGE BEng Industrial Engineering BEng Industrial Engineering ENGAGE BEng Mechanical Engineering BEng Mechanical Engineering ENGAGE BEng Metallurgical Engineering BEng Metallurgical Engineering ENGAGE BEng Mining Engineering BEng Mining Engineering ENGAGE
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	No prerequisites.
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Anthropology and Archaeology
Period of presentation	Semester 1

Module content

Social sciences: Perspectives on contemporary society

An introduction to long-standing questions about the nature of human societies and contemporary challenges. Topics to be discussed include globalisation and increasing connectedness; rising unemployment, inequality and poverty; rapid urbanisation and the modern city form; transformations in the nature of work; environmental degradation and tensions between sustainability and growth; shifts in global power relations; the future of the nation-state and supra-national governance structures; and possibilities for extending human rights and democracy. Critical questions are posed about modern selfhood, sociality, culture and identity against the background of new communications technologies, ever more multicultural societies, enduring gender, class and race inequities, and the emergence of new and the resurgence of older forms of social and political identity. These issues are approached from the vantage of our location in southern Africa and the continent, drawing on social science perspectives.

Humanities and social sciences 120 (HAS 120)

Qualification Undergraduate

Module credits 8.00

Programmes	BEng Chemical Engineering
	BEng Chemical Engineering ENGAGE
	BEng Civil Engineering
	BEng Civil Engineering ENGAGE
	BEng Computer Engineering
	BEng Computer Engineering ENGAGE
	BEng Electrical Engineering
	BEng Electrical Engineering ENGAGE
	BEng Electronic Engineering
	BEng Electronic Engineering ENGAGE
	BEng Industrial Engineering
	BEng Industrial Engineering ENGAGE
	BEng Mechanical Engineering
	BEng Mechanical Engineering ENGAGE
	BEng Metallurgical Engineering
	BEng Metallurgical Engineering ENGAGE
	BEng Mining Engineering
	BEng Mining Engineering ENGAGE

Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	No prerequisites.
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Afrikaans
Period of presentation	Semester 2

Module content

Humanities: Text, culture and communication

Successful communication of ideas, values and traditions depends on understanding both the literal and implied meanings of texts. In this module students are introduced to a variety of texts, including original literary and visual texts, with a view to developing an understanding of how textual meanings have been constructed and negotiated over time. Students are encouraged to understand themselves as products of – and participants in – these traditions, ideas and values. Appropriate examples will be drawn from, among others, the Enlightenment, Modernism, Existentialism, Postmodernism and Post-colonialism.

Law of lease contracts 720 (HKR 720)

Qualification	Postgraduate
Module credits	6.00
Programmes	BScHons Real Estate Retail Property
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Construction Economics
Period of presentation	Semester 2

Module content

Principles of the contractual relationship between tenant and landlord for different types of properties, general clauses that should be included in leases and the legal consequences for parties involved.

Quantities 101 (HVH 101)

Qualification Undergraduate

Module credits 24.00

Programmes [BSc Construction Management](#)
[BSc Quantity Surveying](#)
[BSc Real Estate](#)

Prerequisites No prerequisites.

Contact time 1 practical per week, 3 lectures per week

Language of tuition Module is presented in English

Department Construction Economics

Period of presentation Year

Module content

Introduction to quantity surveying, mensuration; interpretation of drawings, methodology of measuring, working up processes, general instructions, measuring of simple building elements.

Quantities 200 (HVH 200)

Qualification Undergraduate

Module credits 24.00

Programmes [BSc Quantity Surveying](#)

Prerequisites BWT 110 ,BWT 120 and HVH 101

Contact time 1 practical per week, 3 lectures per week

Language of tuition Module is presented in English

Department Construction Economics

Period of presentation Year

Module content

Measuring of simple buildings and simple building elements, and external works. Abstracting and billing.

Quantities 300 (HVH 300)

Qualification Undergraduate

Module credits 24.00

Programmes [BSc Quantity Surveying](#)

Prerequisites BWT 210, BWT 220, GBD 112, GBD 122 and HVH 200

Contact time 1 practical per week, 3 lectures per week

Language of tuition	Afrikaans and English are used in one class
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Department	Construction Economics
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Period of presentation	Year
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Module content

Measuring of concrete structures, precast concrete, structural steelwork, waterproofing, advanced brickwork, rubble walling, stone masonry, plumbing and drainage and electrical work. Theory of monetary allowances in bills of quantities. Abstracting and billing.

Quantities 700 (HVH 700)

Qualification	Postgraduate
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Module credits	20.00
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Programmes	BScHons Quantity Surveying
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Prerequisites	No prerequisites.
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Contact time	1 practical per week, 3 lectures per week
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Language of tuition	Module is presented in English
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Department	Construction Economics
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Period of presentation	Year
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Module content

Measuring of demolitions, alterations, advanced earthworks and mechanical services. Preliminaries, types of bills of quantities and compilation of bills of quantities including the application of the procurement prescripts of the Construction Industry Development Board in the Public Sector. Geotechnical and civil engineering works.

Engineering asset management and maintenance 801 (IAM 801)

Qualification	Postgraduate
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Module credits	10.00
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Programmes	MEng Engineering Management (Coursework) MSc Engineering Management (Coursework)
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Prerequisites	No prerequisites.
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Contact time	20 contact hours per semester
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Language of tuition	Module is presented in English
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Department	Engineering and Technology Management
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Period of presentation	Semester 1 or Semester 2
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Module content

Since the beginning of human history, man has continued to engineer artefacts that provide the means to enhance the way we live, often by directly replacing humans in numerous laborious and dangerous tasks. These engineered assets range from indispensable and personalisable gadgets (e.g., mobile phone) and tools (e.g., notebook computer) to small and large scale cyber-physical systems, equipment, facilities, infrastructure, machinery, and industrial plant that are deployed in all aspects of human endeavour. The module emphasises the value doctrine as the basis for managing engineered assets. Thus, the focus is on the synergy between multidisciplinary knowledge areas in science, engineering and technology, as well as the application of cross-disciplinary skills in operations, maintenance, finance, logistics, human resources, inter alia, to achieve effective management of engineered assets that constitute our built environment. Candidates studying the module will be required to analyse case studies and to carry out practical exercises.

Decision analysis and risk management 780 (IBD 780)

Qualification	Postgraduate
Module credits	16.00
Prerequisites	No prerequisites.
Contact time	20 contact hours per semester
Language of tuition	Module is presented in English
Department	Engineering and Technology Management
Period of presentation	Semester 1

Decision analysis 804 (IBD 804)

Qualification	Postgraduate
Module credits	16.00
Prerequisites	No prerequisites.
Contact time	20 contact hours per semester
Language of tuition	Module is presented in English
Department	Engineering and Technology Management
Period of presentation	Semester 2

Project economics 880 (IBD 880)

Qualification	Postgraduate
Module credits	10.00
Programmes	MEng Technology and Innovation Management (Coursework) MSc Technology and Innovation Management (Coursework)
Prerequisites	No prerequisites.
Contact time	20 contact hours per semester
Language of tuition	Module is presented in English

Department	Engineering and Technology Management
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Period of presentation	Semester 1 or Semester 2
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Module content

This module will focus on insight in the field of Decision Analysis (DA), Risk Management (RM) and Techno-Economic Analysis (TEA), with the application of the basic principles of decision analysis, risk identification, feasibility assessment and financial return in the context of innovation and technology activities within the enterprise. Theory and practice are important and is illustrated by for example the application of DA and TEA in various functional areas of the enterprise. Techno-economics analysis (TEA), also referred to as economic feasibility studies, is a core technique which is used to support decision making within the technology and innovation context of enterprises. Some of the fundamental approaches for DA, RM and TEA use the generic models of net present values, discounted cash flows, internal rates of return and the time value of money to compare expenses against earnings. In this module, aspects of the principles of techno-economics and the structure of TEA will be integrated with DA and RM to support and guide decisions relating to investment in, for example, future technology and innovation projects.

Systems thinking 801 (IBI 801)

Qualification	Postgraduate
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Module credits	10.00
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Programmes	MEng Engineering Management (Coursework) MEng Project Management (Coursework) MEng Technology and Innovation Management (Coursework) MSc Engineering Management (Coursework) MSc Project Management (Coursework) MSc Technology and Innovation Management (Coursework)
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Prerequisites	No prerequisites.
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Contact time	20 contact hours per semester
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Language of tuition	Module is presented in English
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Department	Engineering and Technology Management
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Period of presentation	Semester 1 or Semester 2
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Module content

The modern world consists of “systems”. This is evident from everyday discussions. Statements such as “The system failed us”, or “The national energy system is under pressure” abound. Most people have little or no understanding of what a system is, or how to deal with it. Digging deeper into the concept of “system” leads one to realise that engineers and scientists without any working knowledge of “systems thinking”, or as some describe it, “thinking in systems”, rarely succeed when attempting to solve the problems of our time mainly because they do not know how to deal with trending patterns. Peter Senge, author of the book *The Fifth Discipline* and well-known systems thinker, defines systems thinking as “both a thinking skill and a language for understanding and working with complexity”. This module will provide you with the know-how and tools to achieve the desired outcomes in your real-world environment, notably when that world includes complex and wicked problems. The real-world in this case includes people as well. This module will challenge almost everything you have been taught to date. After completing this module you will view the world in a different way. You will become a big-picture thinker who can transcend your own discipline with ease. The module includes the history and benefits of systems thinking, systems thinking terminology, managing interrelationships, overview of appropriate tools and methodologies including system dynamics, soft systems methodology, systemigrams, etc. These will be illustrated further by applying them to relevant case studies. This module is the ideal complement to systems engineering, which focuses mainly on hard systems whereas systems thinking focuses on soft systems.

The role of projects in realising (more) sustainable business strategies and a more sustainable society is one of the emerging topics in project management. From the literature on this topic, two types of relationship between sustainability and project management appear: the sustainability of the project’s product, the deliverable the project realises, and the sustainability of the project’s process of delivering and managing the project. The first relationship, sustainable projects, is well studied and addressed, for example in relationship to eco-design and ‘green’ construction. The second relationship, sustainable project management, is emerging as a new ‘school of thought’ in project management.

As project managers play a pivotal role in the sustainability of their projects, this module will discuss the ‘why?’, ‘what?’ and ‘how?’ of sustainable project management. The lectures will discuss the concepts of sustainability, the role of projects in sustainability, the impact of sustainability on project management, the integration of sustainability in the project management process and the structure of a ‘Sustainability Management Plan’.

Industrial marketing 880 (IBM 880)

Qualification	Postgraduate
Module credits	16.00
Prerequisites	No prerequisites.
Contact time	14 lectures per week, 2 web-based periods per week, 22 other contact sessions per week, 6 discussion classes per week
Language of tuition	Module is presented in English
Department	Engineering and Technology Management
Period of presentation	Semester 1

Technological entrepreneurship 780 (IEE 780)

Qualification	Postgraduate
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Module credits	16.00
Programmes	BEngHons Engineering and Technology Management BScHons Engineering and Technology Management
Prerequisites	No prerequisites.
Contact time	20 contact hours per semester
Language of tuition	Module is presented in English
Department	Engineering and Technology Management
Period of presentation	Semester 1 and Semester 2

Module content

Technical solutions can overcome various problems confronting the world, but new business leaders need to emerge by identifying these potential opportunities that can lead to sustainable enterprises with more employment opportunities. The module highlights the role of technology innovation and strategy in entrepreneurship, the development of business models and plan, the lean start-up principle, legal aspects and venture leadership. Entrepreneurship is an intellectual discipline in its own right with its own systematic methods and techniques that can be learned and mastered through professional practice and hard work. This module will equip you with the fundamentals of technological entrepreneurship that can be applied in new ventures or your existing career.

Corporate entrepreneurship 880 (IEE 880)

Qualification	Postgraduate
Module credits	10.00
Programmes	MEng Technology and Innovation Management (Coursework) MSc Technology and Innovation Management (Coursework)
Prerequisites	No prerequisites.
Contact time	20 contact hours per semester
Language of tuition	Module is presented in English
Department	Engineering and Technology Management
Period of presentation	Semester 1 or Semester 2

Module content

Corporate Entrepreneurship (CE) or Intrapreneurship refers to the means by which an organisation revitalises itself and alters its competitive contour through embarking in entrepreneurial activities which focus on innovation. CE is one of the key tools to take organisations forward in an environment faced by global challenges. This module focuses on the fundamentals of CE, how to design an entrepreneurial organisation, building cultures to support technological intrapreneurship, business model innovation, organisational digital transformation, and how to enable continuous intrapreneurial performance within a corporation.

Research project 780 (IGB 780)

Qualification	Postgraduate
Module credits	32.00

Programmes	BEngHons Engineering and Technology Management
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Contact time	20 contact hours
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Language of tuition	Module is presented in English
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Department	Engineering and Technology Management
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Period of presentation	Semester 1 and Semester 2
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Module content

The research project is the capstone of the MOT programme. It comprises an independent research study into an area of technology management, applying the principles learned during the programme. Although this is a research project of limited breadth and scope, it nonetheless has to comply with the requirements of scientific research on post-graduate level. The total volume of work that is to be invested in this module by an average student must be 320 hours. Normal requirements for assessment that include the use of an external examiner apply to this module.

Engineering services management 801 (IGB 801)

Qualification	Postgraduate
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Module credits	16.00
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Prerequisites	No prerequisites.
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Contact time	20 contact hours per semester
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Language of tuition	Module is presented in English
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Department	Engineering and Technology Management
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Period of presentation	Semester 1
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Advanced engineering services management 802 (IGB 802)

Qualification	Postgraduate
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Module credits	16.00
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Prerequisites	No prerequisites.
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Contact time	20 contact hours per semester
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Language of tuition	Module is presented in English
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Department	Engineering and Technology Management
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Period of presentation	Semester 2
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Mini-dissertation 898 (IGB 898)

Qualification	Postgraduate
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Module credits	90.00
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Prerequisites	No prerequisites.
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Language of tuition	Module is presented in English
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Department	Engineering and Technology Management
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Period of presentation	Year
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Module content

A research project on a topic of the student's choice from any of the modules offered by the Graduate School of Technology Management is done. The work takes place under the supervision of a study leader (project adviser). In addition to the satisfactory completion of the report itself, the student also has to prepare an article based on the project and present it at the final-year symposium held during November each year. Evaluation is based on the report content, article, as well as the presentation. A follow-up symposium is also held during May in the next year.

Mini-dissertation 899 (IGB 899)

Qualification	Postgraduate
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Module credits	90.00
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Programmes	MEng Engineering Management (Coursework) MEng Project Management (Coursework) MEng Technology and Innovation Management (Coursework)
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Prerequisites	No prerequisites.
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Language of tuition	Module is presented in English
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Department	Engineering and Technology Management
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Period of presentation	Year
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Module content

A research project on a topic of the student's choice from any of the modules offered by the Graduate School of Technology Management is done. The work takes place under the supervision of a study leader (project adviser). In addition to the satisfactory completion of the report itself, the student also has to prepare an article based on the project and present it at the final-year symposium held during November each year. Evaluation is based on the report content, article, as well as the presentation. A follow-up symposium is also held during May in the next year.

Thesis: Engineering management 990 (IGB 990)

Qualification	Postgraduate
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Module credits	360.00
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Programmes	PhD Engineering Management
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Prerequisites	No prerequisites.
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Language of tuition	Module is presented in English
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Department	Engineering and Technology Management
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Period of presentation	Year
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Engineering geology 703 (IGL 703)

Qualification	Postgraduate
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Module credits	16.00
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Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	No prerequisites.
Contact time	20 Contact hours
Language of tuition	Module is presented in English
Department	Geology
Period of presentation	Semester 1

Engineering geology 704 (IGL 704)

Qualification	Postgraduate
Module credits	16.00
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	No prerequisites.
Contact time	10 lectures per week
Language of tuition	Module is presented in English
Department	Geology
Period of presentation	Semester 2

Project organisation 801 (IHR 801)

Qualification	Postgraduate
Module credits	10.00
Programmes	MEng Project Management (Coursework) MSc Project Management (Coursework)
Prerequisites	No prerequisites.
Contact time	20 contact hours per semester
Language of tuition	Module is presented in English
Department	Engineering and Technology Management
Period of presentation	Semester 1 or Semester 2

Module content

This module takes an in-depth look at the conscious and unconscious human dynamics that affect the performance of project teams. The importance and complexity of the project manager's leadership role in containing and transforming anxiety into creative and productive energy is emphasised. The systemic relatedness between project teams and the social systems (organisation, industry, nation state) they form part of, and what this asks of the project manager, are explored. The module looks at the dynamics of authority, delegation, roles, boundaries, change, diversity, inclusion and exclusion and how the less obvious dimensions of these dynamics can be observed and responded to. The idea of the system-in-the-mind and how this influences the 'mind-of-the-system' is studied and experienced in class. The module draws on literature from the fields of organisational behaviour, leadership, systems psychodynamics and group relations. The module consists of self-study, experiential discussions in class, group work and individual work.

Industrial marketing 801 (IIM 801)

Qualification	Postgraduate
Module credits	10.00
Programmes	MEng Engineering Management (Coursework) MEng Project Management (Coursework) MEng Technology and Innovation Management (Coursework) MSc Engineering Management (Coursework) MSc Project Management (Coursework) MSc Technology and Innovation Management (Coursework)
Prerequisites	No prerequisites.
Contact time	20 contact hours per semester
Language of tuition	Module is presented in English
Department	Engineering and Technology Management
Period of presentation	Semester 1 or Semester 2

Module content

This module will primarily address marketing in the industrial environment, not commercial environment. It is based on the principles of business to business marketing (B2B) as well as services marketing. The primary objective of this module is to provide students from a technology or engineering background with a thorough foundation of basic marketing principles and how it can be applied in practice. The areas of market segmentation, macro and micro market environment, developing a value proposition, and understanding buyer behaviour will be explained. Services marketing will include: service development and design, pricing aspects, how services are delivered, how to manage employees and customers in service delivery, managing demand and supply, marketing communication aspects, building customer relationships and loyalty, and how to recover service failures.

Engineering logistics 780 (IIX 780)

Qualification	Postgraduate
Module credits	16.00
Prerequisites	No prerequisites.

Contact time	20 contact hours per semester
Language of tuition	Module is presented in English
Department	Engineering and Technology Management
Period of presentation	Semester 2

Commercialisation and intellectual property 881 (IKG 881)

Qualification	Postgraduate
Module credits	10.00

Programmes	MEng Engineering Management (Coursework) MEng Project Management (Coursework) MEng Technology and Innovation Management (Coursework) MSc Engineering Management (Coursework) MSc Project Management (Coursework) MSc Technology and Innovation Management (Coursework)
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Prerequisites	No prerequisites.
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Contact time	20 contact hours per semester
Language of tuition	Module is presented in English
Department	Engineering and Technology Management
Period of presentation	Semester 1 or Semester 2

Module content

Modern societies increasingly depend on the development and successful commercialisation of new technology that may exist either in the form of knowledge, process, product, service, or combinations of these forms. The module addresses principles and practices required to identify and package technology so as to increase the chance of successful commercialisation. The module highlights the significance of the systems of innovation concept and emphasises the integration of innovation and technology management with entrepreneurial flair in order to facilitate successful commercialisation of technology towards the generation of economic growth, wealth and prosperity. Candidates studying the module will be required to analyse case studies and to carry out a practical exercise.

Quality management 801 (IKK 801)

Qualification	Postgraduate
Module credits	10.00

Programmes	MEng Engineering Management (Coursework) MEng Technology and Innovation Management (Coursework) MSc Engineering Management (Coursework) MSc Technology and Innovation Management (Coursework)
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Prerequisites	No prerequisites.
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Contact time	20 contact hours per semester
Language of tuition	Module is presented in English

Department	Engineering and Technology Management
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Period of presentation	Semester 1 or Semester 2
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Module content

The general objective with this module is to emphasise understanding and application of the concepts of quality management within technological enterprises. The module focuses on important concepts and definitions of quality such as quality in design and processes to ensure customer satisfaction. The role and relevance of quality management systems and standards. The link between quality and competitive advantage, leadership, ethics, culture, empowerment, partnering, and teamwork. The measurement of quality and the use of tools and techniques for process and product improvement. Organisational quality management implementation strategies.

Engineering technology economics 780 (IKN 780)

Qualification	Postgraduate
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Module credits	16.00
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Programmes	BEngHons Engineering and Technology Management BScHons Applied Science Mechanics: Physical Asset Management BScHons Engineering and Technology Management
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Prerequisites	No prerequisites.
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Contact time	20 contact hours per semester
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Language of tuition	Module is presented in English
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Department	Engineering and Technology Management
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Period of presentation	Semester 1 and Semester 2
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Module content

Engineering Economy assists the engineer in making a wide range of decisions. These decisions involve the fundamental elements of monetary cash flow, time, value of money, project life and the interest rate. Engineering Economy calculates the net present worth, future worth, annual equivalent worth and the internal rentability of the cash flows of the alternatives under consideration. By applying these values in different ways, the most economical alternative can be identified. Calculation of these values for a cash flow takes into account the effective interest rate, inflation and the income tax payable.

Knowledge and information management 884 (ILB 884)

Qualification	Postgraduate
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Module credits	10.00
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Programmes	MEng Engineering Management (Coursework) MEng Project Management (Coursework) MEng Technology and Innovation Management (Coursework) MSc Engineering Management (Coursework) MSc Project Management (Coursework) MSc Technology and Innovation Management (Coursework)
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Prerequisites	No prerequisites.
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Contact time	20 contact hours per semester
Language of tuition	Module is presented in English
Department	Informatics
Period of presentation	Semester 1 or Semester 2

Legal aspects 803 (ILC 803)

Qualification	Postgraduate
Module credits	10.00
Programmes	MEng Engineering Management (Coursework) MEng Project Management (Coursework) MEng Technology and Innovation Management (Coursework) MSc Engineering Management (Coursework) MSc Project Management (Coursework) MSc Technology and Innovation Management (Coursework)

Prerequisites	No prerequisites.
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Contact time	20 contact hours per semester
Language of tuition	Module is presented in English
Department	Engineering and Technology Management
Period of presentation	Semester 1 or Semester 2

Module content

The objective of this module is to present the basic principles of the law with which the project manager has to deal with during the planning and execution of a project. An introduction is presented on the sources of law, the structure of the South African legal system and representatives sources of obligations. The general law of contract is done in great detail with special reference to clauses used in contracts, different types of contracts as well as breach and remedies. Practical examples are given to enable the student to understand how the law is applied in practice. Special attention is then given to the law of purchase and sale and to construction/engineering law (letting and hiring of work). Further attention is also given to aspects of labour law and alternative dispute resolution. Another relevant aspect discussed in less detail is representation (agency).

Life cycle engineering 780 (ILE 780)

Qualification	Postgraduate
Module credits	16.00
Prerequisites	No prerequisites.
Contact time	20 contact hours per semester
Language of tuition	Module is presented in English
Department	Engineering and Technology Management
Period of presentation	Semester 1

Sustainability 802 (ILE 802)

Qualification	Postgraduate
Module credits	10.00
Programmes	MEng Engineering Management (Coursework) MEng Project Management (Coursework) MEng Technology and Innovation Management (Coursework) MSc Engineering Management (Coursework) MSc Project Management (Coursework) MSc Technology and Innovation Management (Coursework)
Prerequisites	No prerequisites.
Contact time	20 contact hours per semester
Language of tuition	Module is presented in English
Department	Engineering and Technology Management
Period of presentation	Semester 1 or Semester 2

Module content

The role of projects in realising (more) sustainable business strategies and a more sustainable society is one of the emerging topics in project management. From the literature on this topic, two types of relationship between sustainability and project management appear: the sustainability of the project's product, the deliverable the project realises, and the sustainability of the project's process of delivering and managing the project. The first relationship, sustainable projects, is well studied and addressed, for example in relationship to eco-design and 'green' construction. The second relationship, sustainable project management, is emerging as a new 'school of thought' in project management.

As project managers play a pivotal role in the sustainability of their projects, this course will discuss the 'why?', 'what?' and 'how?' of sustainable project management. The lectures will discuss the concepts of sustainability, the role of projects in sustainability, the impact of sustainability on project management, the integration of sustainability in the project management process and the structure of a 'Sustainability Management Plan'.

Literature study 801 (ILS 801)

Qualification	Postgraduate
Module credits	10.00
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Engineering and Technology Management
Period of presentation	Semester 2

Module content

The overall objective of this module is to provide students with sufficient knowledge and skills to undertake a detailed and comprehensive literature review. This module is an integral part of the research component and will be aligned with the research proposal of the student. The major part of the module consists of individual self-study done by the student outside the classroom in his/her own time, complemented by student-centred and co-operative learning/teaching methods during lectures. The self-study includes prescribed reading and individual assignments.

Maintenance and asset management 780 (IMC 780)

Qualification	Postgraduate
Module credits	16.00
Programmes	BEngHons Engineering and Technology Management BScHons Applied Science Mechanics: Physical Asset Management BScHons Engineering and Technology Management
Prerequisites	No prerequisites.
Contact time	20 contact hours per semester
Language of tuition	Module is presented in English
Department	Engineering and Technology Management
Period of presentation	Semester 1 and Semester 2

Module content

Every man-made component, spare part, equipment, system or infrastructure has an inherent reliability that is determined by design, construction, installation, manufacture or how it is built. This inherent reliability is influenced by both organisational and physical conditions under which, for example, an item of equipment operates. The operational reliability significantly determines the availability of the equipment. A primary objective of maintenance intervention is to eliminate the operating environment hazards, which reduce the operational reliability of equipment and consequently, the availability of equipment for use. In the event of malfunction or failure, the goal of maintenance is to restore the operational reliability and availability of an item of equipment. Irrespective of whether a maintenance activity is intervening or restorative, it needs to be properly planned, scheduled and executed towards achieving the highest levels of operational reliability and availability, whilst concurrently minimising the expenditure of time and resources. Organisational systems of work (which encompass business processes, culture, and information technology) greatly influence the planning, scheduling and execution of maintenance activities. Furthermore, knowledge of technologies embedded, as well as how various items of equipment malfunction or fail in operation, determines how well the maintenance activities are planned, scheduled and executed. The content of the module not only covers strategies, technical principles, practical processes and systems but also includes standards (e.g., CEN13306) and legislative guidelines that influence the management of maintenance in all industrial sectors. The content will also include an introduction to the ISO 5500x asset management standards.

Knowledge management 880 (IMK 880)

Qualification	Postgraduate
Module credits	10.00

Prerequisites	No prerequisites.
Contact time	20 contact hours
Language of tuition	Module is presented in English
Department	Engineering and Technology Management
Period of presentation	Semester 1 or Semester 2

Module content

The objective of this module is to provide an overview of the fundamental concepts and theories of knowledge management from the perspective of technology and innovation management in competitive organisations. Topics addressed include inter alia: Definitions, evolution and context of knowledge; the sourcing, transfer and dissemination of knowledge in the sciences and engineering environments; knowledge management in specific applications such as project management, technology and business intelligence, innovation, etc; human and organisational factors for successful knowledge management in technology-based enterprises.

Project management practice 801 (IMP 801)

Qualification	Postgraduate
Module credits	10.00
Prerequisites	No prerequisites.
Contact time	20 contact hours per semester
Language of tuition	Module is presented in English
Department	Engineering and Technology Management
Period of presentation	Semester 1 or Semester 2

Project planning 802 (IMP 802)

Qualification	Postgraduate
Module credits	10.00
Programmes	MEng Engineering Management (Coursework) MEng Project Management (Coursework) MEng Technology and Innovation Management (Coursework) MSc Engineering Management (Coursework) MSc Project Management (Coursework) MSc Technology and Innovation Management (Coursework)
Prerequisites	No prerequisites.
Contact time	20 contact hours per semester
Language of tuition	Module is presented in English
Department	Engineering and Technology Management
Period of presentation	Semester 1 or Semester 2

Module content

Project Planning introduces the learner to the basic concepts of project management. This module will set the scene for the rest of the MPM programme and addresses project management principles, standards, guidelines, institutes, certifications, professionalism and best practices. Defining and designing a project life-cycle is discussed followed by the process of initiating and planning a project. The importance of a well-defined scope statement and work-breakdown structure are explained which will include needs analysis, user requirement definitions and systems thinking. Time management remains integral with different scheduling techniques addressed and applied. The last part of the module provides an overview of the module to follow and how each will fit into the total discipline of project management.

Multimedia 110 (IMY 110)

Qualification	Undergraduate
Module credits	12.00
Programmes	BIS Multimedia
Prerequisites	No prerequisites.
Contact time	2 lectures per week, 2 practicals per week
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Semester 1

Module content

*Closed – requires departmental selection. Open to BIT, BSc:IT and BSc CS students.

Mark-up Languages. This module explores the role of mark-up languages in the information environment; the difference between the logical structure and the appearance of documents; the study of HTML, CSS and XHTML; the building of websites and basic information architecture.

Multimedia 120 (IMY 120)

Qualification	Undergraduate
Module credits	12.00
Programmes	BIS Multimedia
Prerequisites	IMY 110
Contact time	2 lectures per week, 2 practicals per week
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Semester 2

Module content

*Closed – requires departmental selection.

Multimedia for the Web. This module introduces the process of creating and editing images, animation, basic interactive content, and sound for the web using multimedia authoring tools, such as Adobe Photoshop, Adobe Flash (with basic ActionScript), and Adobe Audition.

Multimedia 210 (IMY 210)

Qualification	Undergraduate
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Module credits	16.00
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Programmes	BIS Multimedia BSc Information and Knowledge Systems
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Prerequisites	IMY 110 or equivalent HTML knowledge
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Contact time	2 lectures per week, 2 practicals per week
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Language of tuition	Module is presented in English
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Department	Information Science
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Period of presentation	Semester 1
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Module content

*Closed – requires departmental selection.

Advanced Markup Languages 1. This module investigates XML and its related technologies (such as XSLT, XPath, XSL-FO, DTD, XML Schema, and namespaces) as a vital part of the web development process.

Multimedia 211 (IMY 211)

Qualification	Undergraduate
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Module credits	20.00
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Programmes	BIS Multimedia
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Prerequisites	Departmental selection
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Contact time	3 lectures per week, 3 practicals per week
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Language of tuition	Module is presented in English
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Department	Information Science
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Period of presentation	Semester 1
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Module content

*Closed - requires departmental selection.

Multimedia and hypermedia theory. This module offers the opportunity to make a thorough study of the theory and applications of multimedia and hypermedia. This includes: multimedia products, multimedia authoring tools, hypermedia databases, digital publications on the World Wide Web, New Media, as well as information architecture, websites and the social realities and impact of the World Wide Web.

Multimedia 220 (IMY 220)

Qualification	Undergraduate
Module credits	16.00
Programmes	BIS Multimedia BSc Information and Knowledge Systems
Prerequisites	IMY 210 and COS 216
Contact time	2 lectures per week, 2 practicals per week
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Semester 2

Module content

*Closed - requires departmental selection.

Advanced Markup Languages 2. This module assumes knowledge of dynamic scripts and basic web based technologies such as PHP as well as the use of relational databases like MySQL. The module explores the interplay between scripting languages, databases, and current industry standard web technologies, from both the server-side and client-side perspectives. The module has a focus on developing hands-on practical skills.

Multimedia: Project 300 (IMY 300)

Qualification	Undergraduate
Module credits	45.00
Programmes	BIS Multimedia
Prerequisites	COS 212
Contact time	1 practical per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Year

Module content

*Closed - requires departmental selection.

The module enables students to combine all their knowledge gained through out their studies to create a functional game. The course consists of extensive game design theory teaching. The students create a game by following an iterative design process, extensive documentation and in depth play testing and usability testing. The final product is a creative, innovative and complete game.

Multimedia 310 (IMY 310)

Qualification	Undergraduate
Module credits	30.00
Programmes	BIS Multimedia BSc Information and Knowledge Systems

Prerequisites	No prerequisites.
Contact time	3 lectures per week, 3 practicals per week
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Semester 1

Module content

*Closed - requires departmental selection.

Human-computer Interaction. This module involves a study of human-computer interaction and human-information interaction; humans as computer and information users; and the ethical aspects relating to the creation of multimedia information products. A detailed study of the role, composition and functioning of an interface, underlying principles in the design and evaluation of interfaces, will also be undertaken.

Multimedia 320 (IMY 320)

Qualification	Undergraduate
Module credits	30.00
Programmes	BIS Multimedia
Prerequisites	No prerequisites.
Contact time	3 lectures per week, 3 practicals per week
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Semester 2

Module content

*Closed - requires departmental selection.

Trends. This module deals with technical aspects of multimedia hardware and software, digital video and audio formats and compression; and version management. A detailed study of the latest developments in mark-up languages and related technologies will also be undertaken.

Multimedia trends 471 (IMY 471)

Qualification	Undergraduate
Module credits	15.00
Prerequisites	COS 301 and at least two COS modules at third-year level.
Contact time	1 lecture per week
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Semester 2

Module content

History of multimedia ideas and technology; current trends in multimedia, latest technologies and future trends of multimedia.

Hypermedia and mark-up languages 472 (IMY 472)

Qualification	Undergraduate
Module credits	15.00
Prerequisites	COS 301 or IMY 300 or INF 370.
Contact time	1 lecture per week
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Semester 1

Module content

A study of hypermedia systems, specifically adaptive hypermedia systems, as well as data modelling, storage and retrieval, database structures and metadata. A study of different mark-up languages and their role in multimedia products with the emphasis on data structuring, hyper linking theories and models.

Multimedia technology 473 (IMY 473)

Qualification	Undergraduate
Module credits	15.00
Prerequisites	COS 301 or IMY 300 or INF 370.
Contact time	1 lecture per week
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Semester 1

Module content

In this module students will research and discuss a current topic which can change from year to year. The topic for a specific year can be obtained from the departmental website. The topic is related to the creative use of Multimedia Technologies. An understanding of the current multimedia trends is required together with the knowledge of its usage.

Animation theory and practice 477 (IMY 477)

Qualification	Undergraduate
Module credits	15.00
Prerequisites	COS 301 or IMY 300 or INF 370.
Contact time	1 lecture per week
Language of tuition	Module is presented in English

Department	Information Science
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Period of presentation	Semester 1
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Module content

This module provides an overview of the historic and current principles and practice of natural motion animation. Different animation techniques are covered, such as stop motion, traditional animation, and 3D animation. The student receives an opportunity to create an animated short film using a technique of their choice.

Human-computer interaction 479 (IMY 479)

Qualification	Undergraduate
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Module credits	15.00
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Prerequisites	COS 301 or IMY 300 or INF 370.
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Contact time	1 lecture per week
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Language of tuition	Module is presented in English
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Department	Information Science
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Period of presentation	Semester 2
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Module content

In this module, students are exposed to research topics and methodologies within the HCI discipline. Students then apply their understanding by proposing and delivering a research paper.

Virtual environments 700 (IMY 700)

Qualification	Postgraduate
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Module credits	15.00
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Prerequisites	No prerequisites.
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Language of tuition	Module is presented in English
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Department	Information Science
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Period of presentation	Semester 2
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Module content

This module exposes students to virtual environments, ranging from fully immersive virtual reality to online virtual worlds. Starting with the notion of reality and how it is simulated, students learn about hardware, software and human factors associated with the creation and exploration of virtual environments. Students are also exposed to VE platforms and techniques, which they use to create a virtual world.

Animation theory and practice 701 (IMY 701)

Qualification	Postgraduate
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Module credits	15.00
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Prerequisites	No prerequisite.
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Language of tuition	Module is presented in English
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Department	Information Science
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Period of presentation	Semester 1
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Module content

This module provides an overview of the historic and current principles and practice of natural motion animation. Different animation techniques are covered, such as stop motion, traditional animation, and 3D animation. The student receives an opportunity to create an animated short film using a technique of their choice.

Multimedia research project 761 (IMY 761)

Qualification	Postgraduate
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Module credits	30.00
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Programmes	BISHons Multimedia
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Prerequisites	No prerequisites.
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Contact time	2 lectures per week
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Language of tuition	Module is presented in English
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Department	Information Science
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Period of presentation	Year
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Module content

*Closed module

Development and production of a multimedia product; product life-cycle management and documentation; the student submits a proposal which is evaluated and if approved, produces a working multimedia product.

Multimedia trends 771 (IMY 771)

Qualification	Postgraduate
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Module credits	15.00
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Programmes	BISHons Multimedia
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Prerequisites	No prerequisites.
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Contact time	1 lecture per week
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Language of tuition	Module is presented in English
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Department	Information Science
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Period of presentation	Semester 2
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Module content

History of multimedia ideas and technology; current trends in multimedia, latest technologies and future trends of multimedia.

Hypermedia and mark-up languages 772 (IMY 772)

Qualification	Postgraduate
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Module credits	15.00
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Programmes	BISHons Multimedia
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Prerequisites	No prerequisites.
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Contact time	1 lecture per week
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Language of tuition	Module is presented in English
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Department	Information Science
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Period of presentation	Semester 1
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Module content

A study of hypermedia systems, specifically adaptive hypermedia systems, as well as data modelling, storage and retrieval, database structures and metadata. A study of different mark-up languages and their role in multimedia products with the emphasis on data structuring, hyper linking theories and models.

Multimedia technology 773 (IMY 773)

Qualification	Postgraduate
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Module credits	15.00
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Programmes	BISHons Multimedia
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Prerequisites	No prerequisites.
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Contact time	1 lecture per week
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Language of tuition	Module is presented in English
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Department	Information Science
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Period of presentation	Semester 1
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Module content

In this module students will research and discuss a current topic which can change from year to year. The topic for a specific year can be obtained from the departmental website. The topic is related to the creative use of Multimedia Technologies. An understanding of the current multimedia trends is required together with the knowledge of its usage.

Virtual environments 774 (IMY 774)

Qualification	Postgraduate
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Module credits	15.00
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Programmes	BISHons Multimedia
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Service modules	Faculty of Economic and Management Sciences
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Prerequisites	No prerequisites.
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Contact time	1 lecture per week, 1 practical per week
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Language of tuition	Module is presented in English
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Department	Information Science
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Period of presentation	Semester 2
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Module content

This module exposes students to virtual environments, ranging from fully immersive virtual reality to online virtual worlds. Starting with the notion of reality and how it is simulated, students learn about hardware, software and human factors associated with the creation and exploration of virtual environments. Students are also exposed to VE platforms and techniques, which they use to create a virtual world.

Animation theory and practice 777 (IMY 777)

Qualification	Postgraduate
Module credits	15.00
Programmes	BISHons Multimedia
Service modules	Faculty of Economic and Management Sciences
Prerequisites	No prerequisites.
Contact time	1 lecture per week
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Semester 1

Module content

This module provides an overview of the historic and current principles and practice of natural motion animation. Different animation techniques are covered, such as stop motion, traditional animation, and 3D animation. The student receives an opportunity to create an animated short film using a technique of their choice.

Human-computer interaction 779 (IMY 779)

Qualification	Postgraduate
Module credits	15.00
Programmes	BISHons Multimedia
Prerequisites	No prerequisites.
Contact time	1 lecture per week
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Semester 2

Module content

In this module, students are exposed to research topics and methodologies within the HCI discipline. Students then apply their understanding by proposing and delivering a research paper.

Multimedia: Coursework component 801 (IMY 801)

Qualification	Postgraduate
Module credits	120.00

Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Year
Module content	
	Coursework component

Dissertation: Multimedia 890 (IMY 890)

Qualification	Postgraduate
Module credits	180.00
Programmes	MIS Multimedia
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Year

Mini-dissertation and research portfolio: Library science 896 (IMY 895)

Qualification	Postgraduate
Module credits	120.00
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Year

Thesis: Multimedia 990 (IMY 990)

Qualification	Postgraduate
Module credits	360.00
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Year

Informatics 112 (INF 112)

Qualification	Undergraduate
Module credits	10.00

Programmes	BCom
	BCom Accounting Sciences
	BCom Financial Sciences
	BCom Informatics Information Systems
	BCom Investment Management
	BCom Statistics
	BCom Statistics and Data Science
	BCom Supply Chain Management
	BIS Information Science
	BIT Information Systems
	BSc Extended programme - Physical Sciences
	BSc Geoinformatics

Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Natural and Agricultural Sciences
Prerequisites	A candidate must have passed Mathematics with at least 4 (50-59%) in the Grade 12 examination; or STK 113 60%, STK 123 60% or STK 110
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Informatics
Period of presentation	Semester 2

Module content

Introduction to information systems, information systems in organisations, hardware: input, processing, output, software: systems and application software, organisation of data and information, telecommunications and networks, the Internet and Intranet. Transaction processing systems, management information systems, decision support systems, information systems in business and society, systems analysis, systems design, implementation, maintenance and revision.

Information systems 113 (INF 113)

Qualification	Undergraduate
Module credits	10.00
Programmes	BIT Information Systems
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Informatics
Period of presentation	Semester 1

Module content

Introduction to quantitative methods for Information systems to students.

Informatics 154 (INF 154)

Qualification	Undergraduate
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Module credits	10.00
Programmes	BCom Informatics Information Systems BCom Statistics and Data Science BIS Information Science BIT Information Systems BSc Extended programme - Physical Sciences BSc Geography BSc Geoinformatics BSc Information and Knowledge Systems
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Natural and Agricultural Sciences
Prerequisites	A candidate must have passed Mathematics with at least 4 (50-59%) in the Grade 12 examination
Contact time	1 lecture per week, 2 practicals per week
Language of tuition	Module is presented in English
Department	Informatics
Period of presentation	Semester 1
Module content	Introduction to programming.

Informatics 164 (INF 164)

Qualification	Undergraduate
Module credits	10.00
Programmes	BCom Informatics Information Systems BCom Statistics and Data Science BIS Information Science BIT Information Systems BSc Extended programme - Physical Sciences BSc Geography BSc Geoinformatics BSc Information and Knowledge Systems
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Natural and Agricultural Sciences
Prerequisites	INF 154; A candidate must have passed Mathematics with at least 4 (50-59%) in the Grade 12 examination; AIM 101 or AIM 102 or AIM 111 and AIM 121
Contact time	1 lecture per week, 2 practicals per week
Language of tuition	Module is presented in English
Department	Informatics
Period of presentation	Semester 2

Module content

Programming.

Informatics 171 (INF 171)

Qualification Undergraduate

Module credits 20.00

Programmes BCom Informatics Information Systems
BCom Statistics
BCom Statistics and Data Science
BIS Information Science
BIT Information Systems
BSc Extended programme - Physical Sciences
BSc Geography
BSc Geoinformatics
BSc Information and Knowledge Systems

Service modules Faculty of Engineering, Built Environment and Information Technology
Faculty of Natural and Agricultural Sciences

Prerequisites A candidate must have passed Mathematics with at least 4 (50-59%) in the Grade 12 examination

Contact time 2 lectures per week

Language of tuition Module is presented in English

Department Informatics

Period of presentation Year

Module content

General systems theory, creative problem solving, soft systems methodology. The systems analyst, systems development building blocks, systems development, systems analysis methods, process modelling.

Informatics 214 (INF 214)

Qualification Undergraduate

Module credits 14.00

Programmes BCom
BCom Informatics Information Systems
BCom Statistics
BCom Statistics and Data Science
BIS Information Science
BIT Information Systems
BSc Geography
BSc Geoinformatics

Service modules Faculty of Engineering, Built Environment and Information Technology
Faculty of Natural and Agricultural Sciences

Prerequisites AIM 101 or AIM 111 and AIM 121

Contact time	2 lectures per week, 2 practicals per week
Language of tuition	Module is presented in English
Department	Informatics
Period of presentation	Semester 1

Module content

Database design: the relational model, structured query language (SQL), entity relationship modelling, normalisation, database development life cycle; practical introduction to database design. Databases: advanced entity relationship modelling and normalisation, object-oriented databases, database development life cycle, advanced practical database design.

Informatics 225 (INF 225)

Qualification	Undergraduate
Module credits	14.00
Programmes	BCom BCom Informatics Information Systems BCom Statistics BCom Statistics and Data Science BIS Information Science BIT Information Systems BSc Geography BSc Geoinformatics
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Natural and Agricultural Sciences
Prerequisites	INF 112; AIM 101 or AIM 102 or AIM 111 and AIM 121
Contact time	1 lecture per week, 3 practicals per week
Language of tuition	Module is presented in English
Department	Informatics
Period of presentation	Semester 2

Module content

An overview of systems infrastructure and integration.

Informatics 261 (INF 261)

Qualification	Undergraduate
Module credits	7.00

Programmes	BCom
	BCom Informatics Information Systems
	BCom Statistics
	BCom Statistics and Data Science
	BIS Information Science
	BIT Information Systems
	BSc Geography
	BSc Geoinformatics

Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Natural and Agricultural Sciences
Prerequisites	INF 214
Contact time	1 lecture per week, 1 practical per week
Language of tuition	Module is presented in English
Department	Informatics
Period of presentation	Semester 2

Module content

Database management: transaction management, concurrent processes, recovery, database administration: new developments: distributed databases, client-server databases: practical implementation of databases.

Informatics 271 (INF 271)

Qualification	Undergraduate
Module credits	14.00
Programmes	BCom Informatics Information Systems
	BCom Statistics and Data Science
	BIS Information Science
	BIT Information Systems
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	AIM 101 or AIM 102 or AIM 111 and AIM 121, INF 164, INF 171
Contact time	1 discussion class per week, 1 lecture per week, 1 practical per week
Language of tuition	Module is presented in English
Department	Informatics
Period of presentation	Year

Module content

Systems analysis. Systems design: construction; application architecture; input design; output design; interface design; internal controls; program design; object design; project management; system implementation; use of computer-aided development tools.

Informatics 272 (INF 272)

Qualification	Undergraduate
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Module credits	14.00
Programmes	BCom Informatics Information Systems BCom Statistics and Data Science BIS Information Science BIT Information Systems BSc Information and Knowledge Systems
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Natural and Agricultural Sciences
Prerequisites	AIM 101 or AIM 102 or AIM 111 and AIM 121, INF 164 and INF 171, Regulation IT.3(g)
Contact time	1 lecture per week, 2 practicals per week
Language of tuition	Module is presented in English
Department	Informatics
Period of presentation	Year
Module content	Advanced programming.

Informatics 282 (INF 282)

Qualification	Undergraduate
Module credits	3.00
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Natural and Agricultural Sciences
Prerequisites	FRK 111, FRK 121 or FRK 100 or FRK 101
Contact time	2 practicals per week
Language of tuition	Module is presented in English
Department	Informatics
Period of presentation	Semester 1 and Semester 2
Module content	Computer processing of accounting information.

Informatics 315 (INF 315)

Qualification	Undergraduate
Module credits	15.00
Programmes	BCom Informatics Information Systems BIS Information Science BIT Information Systems
Service modules	Faculty of Engineering, Built Environment and Information Technology

Prerequisites	INF 261, INF 225, INF 271 and INF 272
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Contact time	2 lectures per week
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Language of tuition	Module is presented in English
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Department	Informatics
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Period of presentation	Semester 1
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Module content

A review of current trends which are relevant to the application of information systems within a business environment.

Informatics 324 (INF 324)

Qualification	Undergraduate
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Module credits	15.00
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Programmes	BCom Informatics Information Systems BIS Information Science BIT Information Systems
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Service modules	Faculty of Engineering, Built Environment and Information Technology
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Prerequisites	INF 261, INF 225, INF 271 and INF 272
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Contact time	2 lectures per week
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Language of tuition	Module is presented in English
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Department	Informatics
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Period of presentation	Semester 2
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Module content

Information systems in organisations.

Informatics 354 (INF 354)

Qualification	Undergraduate
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Module credits	15.00
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Programmes	BCom Informatics Information Systems BIT Information Systems BSc Information and Knowledge Systems
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Service modules	Faculty of Engineering, Built Environment and Information Technology
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Prerequisites	INF 261, INF 225, INF 271 and INF 272
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Contact time	1 lecture per week, 2 practicals per week
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Language of tuition	Module is presented in English
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Department	Informatics
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Period of presentation	Semester 1
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Module content

Advanced programming.

Informatics 370 (INF 370)

Qualification	Undergraduate
Module credits	35.00
Programmes	BCom Informatics Information Systems BIT Information Systems
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	INF 261, INF 225, INF 271 and INF 272
Contact time	1 lecture per week, 2 practicals per week
Language of tuition	Module is presented in English
Department	Informatics
Period of presentation	Year

Module content

Application of systems analysis and design in a practical project; programming; use of computer-aided development tools.

Capita selecta 416 (INF 416)

Qualification	Undergraduate
Module credits	15.00
Prerequisites	INF 315 and INF 324.
Contact time	1 lecture per week
Language of tuition	Module is presented in English
Department	Informatics
Period of presentation	Semester 1 or Semester 2

Module content

This module will be used to present special, relevant topics within the expertise of the department.

Management of information systems 494 (INF 494)

Qualification	Undergraduate
Module credits	15.00
Prerequisites	INF 315 and INF 324.
Contact time	1 lecture per week, 1 web-based period per week
Language of tuition	Module is presented in English
Department	Informatics

Period of presentation Semester 1 or Semester 2

Module content

Business process management; ERP systems; IT trends.

Capita selecta 713 (INF 713)

Qualification Postgraduate

Module credits 15.00

Programmes [BITHons Information Systems](#)

Prerequisites No prerequisites.

Contact time 1 web-based period per week, 8 lectures per week

Language of tuition Module is presented in English

Department Informatics

Period of presentation Semester 1 or Semester 2

Module content

This module will be used to present special, relevant topics within the expertise of the department.

Enterprise architecture 715 (INF 715)

Qualification Postgraduate

Module credits 15.00

Programmes [BITHons Information Systems](#)

Prerequisites INF 788

Contact time 1 lecture per week

Language of tuition Module is presented in English

Department Informatics

Period of presentation Semester 1 or Semester 2

Module content

Enterprise Architecture (EA) involves comprehensive business frameworks that capture the complexity of modern organisations, providing a blue-print for co-ordinating and integrating all components of an organisation. The module will illustrate all the aspects of EA, discuss the need for EA as well as various frameworks, methods and techniques of EA.

Capita selecta 716 (INF 716)

Qualification Postgraduate

Module credits 15.00

Programmes [BITHons Information Systems](#)

Prerequisites No prerequisites.

Contact time	1 lecture per week
Language of tuition	Module is presented in English
Department	Informatics
Period of presentation	Semester 1 or Semester 2

Module content

This module will be used to present special, relevant topics within the expertise of the department.

Research report 780 (INF 780)

Qualification	Postgraduate
Module credits	30.00
Programmes	BITHons Information Systems
Contact time	1 other contact session per week, 1 web-based period per week
Language of tuition	Module is presented in English
Department	Informatics
Period of presentation	Year

Module content

A research paper on a topic from the field of informatics.

Data warehousing 785 (INF 785)

Qualification	Postgraduate
Module credits	15.00
Programmes	BITHons Information Systems
Prerequisites	No prerequisites.
Contact time	1 lecture per week, 1 other contact session per week, 1 web-based period per week
Language of tuition	Module is presented in English
Department	Informatics
Period of presentation	Semester 1 or Semester 2

Module content

- Advanced database design
- Advanced database management
- Database architectures and languages
- Data warehousing and data marts
- Current trends

Management of ICT projects 787 (INF 787)

Qualification	Postgraduate
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Module credits	15.00
Programmes	BITHons Information Systems
Prerequisites	No prerequisites.
Contact time	1 lecture per week, 1 other contact session per week, 1 web-based period per week
Language of tuition	Module is presented in English
Department	Informatics
Period of presentation	Semester 1 or Semester 2

Module content

Main emphasis will be on IS project management using a case study to get practical experience in project management.

Information systems development 788 (INF 788)

Qualification	Postgraduate
Module credits	15.00
Programmes	BITHons Information Systems
Prerequisites	No prerequisites.
Contact time	1 lecture per week, 1 web-based period per week
Language of tuition	Module is presented in English
Department	Informatics
Period of presentation	Semester 1 or Semester 2

Module content

Study and evaluation of different systems development methodologies.

Human-computer interaction 790 (INF 790)

Qualification	Postgraduate
Module credits	15.00
Programmes	BITHons Information Systems
Prerequisites	No prerequisites.
Contact time	1 lecture per week, 1 web-based period per week
Language of tuition	Module is presented in English
Department	Informatics
Period of presentation	Semester 1 or Semester 2

Module content

This module will be used to present special, relevant topics within the expertise of the department.

Applied data science 791 (INF 791)

Qualification	Postgraduate
Module credits	15.00
Programmes	BITHons Information Systems
Prerequisites	No prerequisites.
Contact time	1 lecture per week, 1 other contact session per week, 1 web-based period per week
Language of tuition	Module is presented in English
Department	Informatics
Period of presentation	Semester 1 or Semester 2

Module content

In this information age a lot of data is captured every day and recorded in databases, but the wealth of this data is kept locked in the databases because relatively little mining is performed on this data. This module introduces you to data mining in terms of:

- The data mining process - how do you mine data?
- The data mining techniques - an overview of the data mining techniques that can be used;
- Practical data mining experience - a practical project mining real industry data to find unknown patterns; and
- Product overviews - product demonstrations by data mining vendors.

e-Business 793 (INF 793)

Qualification	Postgraduate
Module credits	15.00
Prerequisites	No prerequisites.
Contact time	1 lecture per week, 1 other contact session per week, 1 web-based period per week
Language of tuition	Module is presented in English
Department	Informatics
Period of presentation	Semester 1 or Semester 2

Module content

The analysis of the management, innovation and information systems aspects of the use of e-business technology and strategies.

Management of information systems 794 (INF 794)

Qualification	Postgraduate
Module credits	15.00
Programmes	BComHons Informatics BITHons Information Systems
Prerequisites	No prerequisites.
Contact time	1 lecture per week, 1 web-based period per week

Language of tuition	Module is presented in English
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Department	Informatics
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Period of presentation	Semester 1 or Semester 2
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Module content

Business process management; ERP systems; IT trends.

Big data science elective 801 (INF 801)

Qualification	Postgraduate
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Module credits	5.00
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Programmes	MIT Big Data Science (Coursework)
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Contact time	5 contact hours
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Language of tuition	Module is presented in English
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Department	Informatics
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Period of presentation	Semester 2
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Module content

See existing electives from MIT modules in Stream A and B. In addition to study-leader approval, elective course selection may be subject to course pre-requisites, course availability, and internal departmental regulations as decided by the Head of the Department.

Big data science elective 802 (INF 802)

Qualification	Postgraduate
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Module credits	5.00
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Programmes	MIT Big Data Science (Coursework)
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Contact time	5 contact hours
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Language of tuition	Module is presented in English
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Department	Informatics
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Period of presentation	Semester 2
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Module content

See existing electives from MIT modules in Stream A and B. In addition to study-leader approval, elective course selection may be subject to course pre-requisites, course availability, and internal departmental regulations as decided by the Head of the Department.

Research methodology 800 (INI 800)

Qualification	Postgraduate
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Module credits	10.00
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Prerequisites	No prerequisites.
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Language of tuition	Module is presented in English
Department	Engineering and Technology Management
Period of presentation	Semester 1 or Semester 2

Module content

The overall objective of this module is to provide students with sufficient knowledge and skills to undertake independent research for a masters' dissertation. The major part of the course consists of individual self-study done by the student outside the classroom in his/her own time, complemented by student-centred and co-operative learning/teaching methods during lectures. The self-study includes prescribed reading, individual assignments and preparation for the examination. The lecturer will act as a guide to the students to acquire the necessary knowledge and skills through self-study and practical exercises, in addition to formal lectures.

Information science 110 (INL 110)

Qualification	Undergraduate
Module credits	12.00
Programmes	BA BA Visual Studies BIS Information Science BIS Multimedia BIS Publishing BIT Information Systems BPolSci Political Studies

Service modules	Faculty of Humanities
Prerequisites	No prerequisites.
Contact time	1 practical per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Semester 1

Module content

This module is an introduction to the study field of information science and its various professions. Key concepts that will be discussed include the following: the human as information processor and user; the life-cycle of information in terms of processes, products and role-players; as well as the communication of information. The social-ethical impact of globalisation is included as a key concern, with reference to Africa.

Information science 120 (INL 120)

Qualification	Undergraduate
Module credits	12.00

Programmes	BA BIS Information Science BIS Multimedia BIT Information Systems BPolSci Political Studies
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Service modules	Faculty of Humanities
Prerequisites	No prerequisites.
Contact time	1 practical per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Semester 2

Module content

Organisation and representation of information. This module provides the student with an introduction to the basic principles and processes underlying the organisation and representation of information. The process of organising information in documents and on the web, in multimedia formats, by means of document image processing and in databases are dealt with. Themes on the representation of information through the creation of metadata include various general and domain specific metadata schemas such as Dublin Core as a metadata standard for the Web, as well as various other metadata schemas.

Practical classes include basic HTML and the design of Web pages incorporating and applying what was covered in theory.

Information science 130 (INL 130)

Qualification	Undergraduate
Module credits	12.00
Programmes	BIS Information Science BIS Publishing BIT Information Systems BPolSci Political Studies
Service modules	Faculty of Humanities
Prerequisites	No prerequisites.
Contact time	1 practical per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Semester 1

Module content

Personal information management. This module focuses on personal information management within an organisational context. It deals with managing information and knowledge that is peculiar to an individual and which enables him/her to perform his/her job.

Topics include: creating an environment in which the individual can manage his/her information and knowledge; the skills needed to be able to manage personal information and knowledge; information overloading which gives rise to personal information and knowledge management, as well as the manner in which individuals can switch from personal information management to personal knowledge management; personal information and knowledge management as a career.

Information science 140 (INL 140)

Qualification	Undergraduate
Module credits	12.00
Programmes	BA Visual Studies BIS Information Science BIS Multimedia BIS Publishing BIT Information Systems BPolSci Political Studies
Service modules	Faculty of Humanities
Prerequisites	No prerequisites.
Contact time	1 practical per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Semester 2

Module content

Information and communication technology. This module offers a brief overview of hardware and software, telecommunications technology, LANs, WANs and intranets, the information highway, the internet and the World Wide Web, computer ethics, ICTs, e-commerce, mobile computing technology and the influence that new trends and developments have on the distribution of information.

Information science 210 (INL 210)

Qualification	Undergraduate
Module credits	20.00
Programmes	BIS Information Science BIT Information Systems BPolSci Political Studies
Service modules	Faculty of Humanities
Prerequisites	AIM 101 or AIM 102 or AIM 111 and 121
Contact time	3 lectures per week, 3 practicals per week

Language of tuition	Module is presented in English
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Department	Information Science
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Period of presentation	Semester 1
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Module content

Information seeking and retrieval. This module explores the theory and practice of effective information seeking and retrieval. It builds on supporting research paradigms such as the systems, user-centred, cognitive and socio-cognitive paradigms. The focus is on the complexities of effective information seeking and retrieval within the context of information behaviour on a personal level, as well as in the context of professional, academic or everyday information needs.

Information science 220 (INL 220)

Qualification	Undergraduate
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Module credits	20.00
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Programmes	BIS Information Science BIT Information Systems BPolSci Political Studies
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Service modules	Faculty of Humanities
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Prerequisites	INL 210 or LP
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Contact time	3 lectures per week, 3 practicals per week
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Language of tuition	Module is presented in English
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Department	Information Science
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Period of presentation	Semester 2
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Module content

Representation and organisation. Information needs to be represented and organised in a system for it to be effectively retrievable. This module deals with the representation and organisation of information on the level of individual entities (e.g. indexing), from the perspective of the users (user profiling), as well as within a document collection (taxonomies and ontologies).

Information science 230 (INL 230)

Qualification	Undergraduate
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Module credits	20.00
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Programmes	BA Visual Studies BIS Information Science BPolSci Political Studies
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Service modules	Faculty of Humanities
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Prerequisites	No prerequisites.
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Contact time	3 lectures per week, 3 practicals per week
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Language of tuition	Module is presented in English
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Department	Information Science
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Period of presentation	Semester 1
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Module content

User studies and dissemination. This module focuses on the individual as seeker, user, reader and communicator of information. Various user groups are identified and their information use and communication patterns and requirements are analysed and investigated. This module covers methods of service provision to facilitate and enhance the use and dissemination of information in accordance with the user's needs.

Information science 240 (INL 240)

Qualification	Undergraduate
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Module credits	20.00
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Programmes	BA Visual Studies BIS Information Science BIS Publishing BPolSci Political Studies
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Service modules	Faculty of Humanities
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Prerequisites	No prerequisites.
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Contact time	3 lectures per week, 3 practicals per week
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Language of tuition	Module is presented in English
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Department	Information Science
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Period of presentation	Semester 1
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Module content

Social and ethical impact. This module examines moral and legal regulation practices related to information in print and digital environments. Different ethical theories are identified and applied to privacy, access to information, information poverty and censorship. The interpretation and enforcement of rules and regulations are discussed.

Information science 260 (INL 260)

Qualification	Undergraduate
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Module credits	20.00
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Programmes	BA Visual Studies BIS Information Science BPolSci Political Studies
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Service modules	Faculty of Humanities
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Prerequisites	No prerequisites.
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Contact time	3 lectures per week, 3 practicals per week
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Language of tuition	Module is presented in English
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Department	Information Science
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Period of presentation Semester 2

Module content

Economics and politics of information. This module examines the economics and politics of information, with a special emphasis on South Africa's information sector. It aims to promote an understanding of the market and non-market qualities of information, and their consequences for the production, distribution and marketing of information goods and services. The ways in which information access and expression are regulated and the use of ICTs in crime and corruption is also addressed.

Information science 270 (INL 270)

Qualification Undergraduate

Module credits 20.00

Programmes [BIS Information Science](#)
[BPolSci Political Studies](#)

Service modules Faculty of Humanities

Prerequisites No prerequisites.

Contact time 3 lectures per week, 3 practicals per week

Language of tuition Module is presented in English

Department Information Science

Period of presentation Semester 2

Module content

Indigenous knowledge and communication. This module focuses on the role and function of Indigenous Knowledge (IK) in the information and knowledge society. Various categories and contexts of IK are explored within international and local perspectives.

Issues pertaining to access and communication of IK, inter alia through Information and Communication Technology (ICT), are addressed in order to ensure sustainable development.

Information science: Information organisation 310 (INL 310)

Qualification Undergraduate

Module credits 30.00

Programmes [BA Visual Studies](#)
[BIS Information Science](#)
[BIT Information Systems](#)
[BPolSci Political Studies](#)
[BSc Computer Science](#)

Service modules Faculty of Humanities

Prerequisites No prerequisites.

Contact time 3 lectures per week, 3 practicals per week

Language of tuition Module is presented in English

Department	Information Science
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Period of presentation	Semester 1
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Module content

Information Organisation. The module is concerned with the organisation of information in the digital environment focusing on the structure and use of document management and workflow systems, as well as distribution channels and virtual environments. The characteristics and application of the internet, intranets, as well as portals and applications use, are considered.

Information science: Information and knowledge management 320 (INL 320)

Qualification	Undergraduate
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Module credits	30.00
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Programmes	BIS Information Science BIT Information Systems BPolSci Political Studies BSc Computer Science
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Service modules	Faculty of Humanities
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Prerequisites	No prerequisites.
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Contact time	3 lectures per week, 3 practicals per week
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Language of tuition	Module is presented in English
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Department	Information Science
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Period of presentation	Semester 2
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Module content

Information and Knowledge Management. This module focuses on information and knowledge management at an operational level and introduces information and knowledge management at a corporate strategic level. It deals with the management of information and knowledge, which enables the organisation to be competitive. In this module the focus is on four aspects, namely: the 21st century organisation, the external and internal stakeholders that have an interest in information products, as well as the infrastructure that should be in place in organisations to manage information products. The module concludes with a few topics relating to information management at a corporate strategic level.

Information science: Digital repositories 340 (INL 340)

Qualification	Undergraduate
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Module credits	30.00
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Programmes	BA Visual Studies BIS Information Science BPolSci Political Studies BSc Computer Science
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Service modules	Faculty of Humanities
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Prerequisites	No prerequisites.
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Contact time	3 lectures per week, 3 practicals per week
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Semester 2

Module content

This module deals with the construction and management of digital repositories. It also addresses the characteristics of the digital repository in a rapidly changing technological world and a challenging information society. Core aspects include: system design, relationships to hybrid libraries, digital collections and rights management, standards, virtual referencing and the development and evaluation of digital repositories.

Information science: Socio-political aspects of information in global context 360 (INL 360)

Qualification	Undergraduate
Module credits	30.00
Programmes	BIS Information Science BPolSci Political Studies BSc Computer Science
Service modules	Faculty of Humanities
Prerequisites	No prerequisites.
Contact time	3 lectures per week, 3 practicals per week
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Semester 1

Module content

This module examines aspects of the information and knowledge society within local, regional and international contexts. A special focus of the module is the interaction and exchange of data, information and knowledge from communities' local knowledge system with data, information and knowledge from the global knowledge system. The module discusses the growth and role of information and communication technologies (ICTs), and their implications for development.

Information science 370 (INL 370)

Qualification	Undergraduate
Module credits	15.00
Programmes	BIS Information Science BSc Computer Science
Prerequisites	INL 210, 220 and INL 310 or registered for INL 310
Contact time	1 lecture per week, 2 practicals per week
Language of tuition	Separate classes for Afrikaans and English

Department	Information Science
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Period of presentation	Year
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Module content

Experiential learning project. This module takes the form of a project and experiential training in co-operation with industry.

Information science: Competitive intelligence 380 (INL 380)

Qualification	Undergraduate
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Module credits	30.00
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Programmes	BIS Information Science BPolSci Political Studies BSc Computer Science
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Service modules	Faculty of Humanities
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Prerequisites	No prerequisites.
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Contact time	3 lectures per week, 3 practicals per week
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Language of tuition	Separate classes for Afrikaans and English
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Department	Information Science
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Period of presentation	Semester 2
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Module content

This module provides an overview of Competitive Intelligence (CI) and focuses on the needs for CI in organisations. The ways in which organisations compete and the benefits that CI can bring to these organisations will also be covered. The growing need for CI among South African organisations will also be examined. Practical examples and case studies will be used to highlight the value of CI in organisations.

Information and knowledge management 802 (INL 802)

Qualification	Postgraduate
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Module credits	30.00
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Prerequisites	No prerequisites.
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Contact time	1 lecture per week
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Language of tuition	Module is presented in English
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Department	Information Science
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Period of presentation	Year
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Module content

The module focuses on an in-depth study of new tendencies and complex concepts in the field of Information and Knowledge Management.

Information ethics and law 803 (INL 803)

Qualification	Postgraduate
Module credits	20.00
Prerequisites	No prerequisites.
Contact time	1 lecture per week
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Year

Module content

This module focuses on the relationship between poverty and information and the effect that it has on the lives of people in South Africa; the Promotion of Access to Information Act; and the philosophical background of Intellectual Property Rights (Hegel, Marx and Lock) and how this Western concept has influenced the digital divide between the information rich and information poor.

Information for development 804 (INL 804)

Qualification	Postgraduate
Module credits	20.00
Prerequisites	No prerequisites.
Contact time	1 lecture per week
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Year

Module content

This module focuses on human development and the importance of disseminating information effectively to developing communities. It includes aspects of participatory communication, the role of communication within the strategic management processes of the development project, elements of participatory message design as well as the role of Information Resource Centres in disseminating information.

Information society 806 (INL 806)

Qualification	Postgraduate
Module credits	20.00
Prerequisites	No prerequisites.
Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Year

Module content

In this module the technological, social and globalisation aspects of the development of information in societies is investigated on three levels: Societies as a whole, organisations that produce information products; render information services; and the individual citizens.

Informetrics 809 (INL 809)

Qualification	Postgraduate
Module credits	20.00
Prerequisites	No prerequisites.
Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Year

Module content

*Requires: Knowledge of Statistics - Consult the department in this regard
Informetrics investigates the quantitative aspects of information (communication) processes, particularly those using text. It incorporates the old field of Bibliometrics, and the new areas of Cybermetrics and Webometrics. Topics covered are: citation indexing, citation networks and citation matrices, bibliographic coupling, co-citation graphs, science policy applications, informetric laws and approximations.

Competitive intelligence 810 (INL 810)

Qualification	Postgraduate
Module credits	20.00
Prerequisites	No prerequisites.
Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Year

Module content

"The next best thing to knowing all about your own business is to know all about the other fellow's business" - John D Rockefeller
Establishing an effective competitive intelligence program is an integral part of every enterprise that wants to survive in the new millennium. This module focuses on the competitive intelligence strategy, intelligence management, intelligence processes, the intelligence resources, competitive technology intelligence and security.

Advanced decision-making theory 811 (INL 811)

Qualification	Postgraduate
Module credits	20.00

Prerequisites	No prerequisites.
Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Year

Module content

Advanced decision-making theory within information and knowledge management is studied in depth. Processes and systems that are used for the management of information and knowledge are analysed concerning decision-making theory. Organisational sense making and scenario building are also addressed.

Organisation and retrieval of information 812 (INL 812)

Qualification	Postgraduate
Module credits	30.00
Prerequisites	No prerequisites.
Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Year

Module content

Theoretical approaches for the organisation and retrieval of information are studied including metadata, ontologies and taxonomies. Organisation of information as well as storage, access and searching of desired information as required by individuals.

Management of information centres 813 (INL 813)

Qualification	Postgraduate
Module credits	20.00
Prerequisites	No prerequisites.
Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Year

Module content

This module covers a study of information centres as business organisations. The focus, therefore, is on the survival of information centres in the business environment, e.g. change management, business processes, re-engineering, strategic human resource management, the impact of technological innovations and modern business practices, focussing on information centres.

Big data science elective 820 (INL 820)

Qualification	Postgraduate
Module credits	5.00
Programmes	MIT Big Data Science (Coursework)
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Semester 2

Module content

Five credits of an elective module can be drawn from Information Science. A module in Research Data Management (RDM) is available as an elective. The following topics would typically be covered: Open Science and the dependency on open (big) data, The research process and the life cycle of big data (data management plans to publishing derivative data sets, licensing and legal implications); managing (curating) big vs long tail data; solving problems with research data vs the business value of big data (data-intensive decisionmaking); managing data as an asset (also data citation); issues and challenges involved in the management of big data (principles and best practices for effective big data governance); trusted data repositories; data stewardship frameworks for big data; and the data steward's toolbox.

Dissertation: Information science 890 (INL 890)

Qualification	Postgraduate
Module credits	180.00
Programmes	MIS Information Science
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Year

Mini-dissertation: Information science 895 (INL 895)

Qualification	Postgraduate
Module credits	90.00
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Year

Thesis: Information science 990 (INL 990)

Qualification	Postgraduate
Module credits	360.00

Programmes	PhD Information Science
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Year

Research methodology 781 (INM 781)

Qualification	Postgraduate
Module credits	16.00
Prerequisites	No prerequisites.
Contact time	14 lectures per week, 22 other contact sessions per week, 6 discussion classes per week
Language of tuition	Module is presented in English
Department	Engineering and Technology Management
Period of presentation	Semester 1

New product development 880 (INP 880)

Qualification	Postgraduate
Module credits	10.00
Programmes	MEng Engineering Management (Coursework) MEng Project Management (Coursework) MEng Technology and Innovation Management (Coursework) MSc Engineering Management (Coursework) MSc Project Management (Coursework) MSc Technology and Innovation Management (Coursework)
Prerequisites	No prerequisites.
Contact time	20 contact hours
Language of tuition	Module is presented in English
Department	Engineering and Technology Management
Period of presentation	Semester 1 or Semester 2

Module content

The development of new products is a key business function. There is always a high risk of failure but the best companies manage to launch successful new products on a continuous basis. The objective of this module is to provide students with the concepts and insight necessary both to do product development and to manage it. The strategies, processes, tools and techniques used by leading-edge companies for new product development are introduced. The module examines different stages of product development, from idea generation to market testing and includes the assessment and selection of appropriate business models. The role and impact of fourth industrial revolution technologies, like rapid prototyping with 3D printing, are also considered. Key questions addressed in the module are: how does product/process development fit into the overall business context; what products, processes, systems or services should be developed; how does one go about developing a new product/process; and how should one measure performance in product/process development and improve? Further selected concepts and topics like design thinking, design management, success factors, relationship to systems engineering, reduction of uncertainty, and software for NPD are also introduced. Although the emphasis is on physical products, many of the concepts covered in the module are equally applicable to service development.

Dissertation: Interior architecture 890 (INT 890)

Qualification	Postgraduate
Module credits	180.00
Programmes	MIntArch
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Architecture
Period of presentation	Year

Thesis: Interior architecture 990 (INT 990)

Qualification	Postgraduate
Module credits	360.00
Programmes	PhD Interior Architecture
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Architecture
Period of presentation	Year

Technology and innovation management 780 (INV 780)

Qualification	Postgraduate
Module credits	16.00
Programmes	BEngHons Engineering and Technology Management BScHons Engineering and Technology Management

Prerequisites	No prerequisites.
Contact time	20 contact hours
Language of tuition	Module is presented in English
Department	Engineering and Technology Management
Period of presentation	Semester 1 and Semester 2

Module content

In an increasingly competitive and fast changing business world the management of technological innovation is a key function of organisations that want to prosper. It is therefore important that engineers, scientists and managers understand the fundamental principles of technology and innovation. This module addresses aspects such as the activities and tools of technology management and the processes and dynamics of innovation as important contributors to the creation of new knowledge, products and processes.

Organisation and innovation 880 (INV 880)

Qualification	Postgraduate
Module credits	10.00
Programmes	MEng Technology and Innovation Management (Coursework) MSc Technology and Innovation Management (Coursework)
Prerequisites	No prerequisites.
Contact time	20 contact hours per semester
Language of tuition	Module is presented in English
Department	Engineering and Technology Management
Period of presentation	Semester 1 or Semester 2

Module content

This module has been designed for master's students wishing to build substantive and methodological knowledge in two profound and related disciplines and phenomena: organisation studies and innovation studies. It focuses on providing an overview of the main concepts, theoretical perspectives and models regarding organisation, technological innovation and the relationships between different forms of organisation and technological innovation (e.g. organising for creativity; systems supporting innovation). This module further explains innovation at several levels of analysis (individuals, teams, organisations, sectors, nations). Students are expected to apply the acquired knowledge in their workplace.

Information behaviour, retrieval and organisation 414 (INY 414)

Qualification	Undergraduate
Module credits	15.00
Prerequisites	No prerequisites.
Contact time	8 meetings per semester
Language of tuition	Module is presented in English
Department	Information Science

Period of presentation Semester 1 or Semester 2

Module content

In any context, understanding of information behaviour (i.e. information activities such as information seeking, retrieval, sharing and avoidance) is essential in the design and evaluation of information retrieval and organisation systems. This includes individual and collaborative information behaviour. Traditional and contemporary theories, models and practices of information behaviour, information retrieval and information organisation are considered in a variety of contexts reflecting contemporary interest.

Information ethics 415 (INY 415)

Qualification Undergraduate

Module credits 15.00

Prerequisites INL 310 or INL 320.

Contact time 8 meetings per semester

Language of tuition Module is presented in English

Department Information Science

Period of presentation Semester 2

Module content

This module focuses on the main moral ethical issues pertaining to information and ICT, globalisation, privacy and knowledge flow. It covers amongst others the following fields: information and computer ethics; cyber warfare and terrorism; information philosophy; information security; privacy and the right to information; digital identity management; cyber law; e-waste; globalisation and the impact on society.

Information and knowledge management (II) 416 (INY 416)

Qualification Undergraduate

Module credits 15.00

Prerequisites INY 413

Contact time 8 meetings per semester

Language of tuition Module is presented in English

Department Information Science

Period of presentation Semester 2

Module content

This module offers students the opportunity to become conversant with various knowledge management programmes as well as the development, implementation and evaluation of knowledge management strategies. It introduces students to traditional and advanced knowledge management models and frameworks, a selection of knowledge management theories, knowledge management's resiliency management role, and trending issues in the field of knowledge management.

Fourth industrial revolution 422 (INY 422)

Qualification	Undergraduate
Module credits	15.00
Prerequisites	INL 310 or INL 320
Contact time	8 meetings per semester
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Semester 1

Module content

This module evaluates the evolution of previous industrial revolutions to the fourth industrial revolution. It compares and critiques the fourth industrial revolution in the light of concepts of the information and knowledge societies, and examines relevant themes in the literature. It also discusses the implications for knowledge workers.

Competitive intelligence (I) 426 (INY 426)

Qualification	Undergraduate
Module credits	15.00
Prerequisites	INL 310 or INL 320.
Contact time	8 meetings per semester
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Semester 1

Module content

This module focuses on the theory and practice of Competitive Intelligence (CI) as a strategic tool in the workplace by examining competitive intelligence as a product, process and organisation.

Competitive intelligence (II) 427 (INY 427)

Qualification	Undergraduate
Module credits	15.00
Prerequisites	INY 426
Contact time	8 meetings per semester
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Semester 2

Module content

The module focuses specifically on the theory and practice of (competitive) Intelligence Analysis and a variety of aspects and techniques from related disciplines which apply to intelligence analysis. The module exposes students to new (intellectually challenging) and useful methods for conducting intelligence analysis as embedded in relevant theory and practices.

Information communication 430 (INY 430)

Qualification	Undergraduate
Module credits	15.00
Prerequisites	INL 310 or INL 320.
Contact time	8 meetings per semester
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Semester 1

Module content

Informed by the participatory approach to communication this module reflects in depth on methods for the effective communication of information. In order to achieve this, the nature of information within the context of Information Science will be investigated. Thereafter, communication media will be identified and discussed and students will learn how to create a target audience profile to determine the appropriate media and content for the dissemination of information. Information and communication technologies (ICTs) and the communication of information will be investigated along with multiliteracy and media literacy. The communication of information will form a central focus of this module. Therefore the role of traditional, interpersonal, as well as modern media will be addressed. The processes of creating meaningful and effective messages for the communication of information as well as intercultural communication will also be undertaken.

Information communication 700 (INY 700)

Qualification	Postgraduate
Module credits	15.00
Programmes	PGDip Digital Innovation
Service modules	Faculty of Economic and Management Sciences
Contact time	1 lecture per week
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Semester 1 or Semester 2

Module content

Informed by the participatory approach to communication this module reflects in depth on methods for the effective communication of information. In order to achieve this, the nature on information within the context on Information Science will be investigated. Thereafter, communication media will be identified and discussed and students will learn how to create a target audience profile to determine the appropriate media and content for the dissemination of information. Information and communication technologies (ICTs) and the communication of information will be investigated along with literacy and media literacy. The communication of information will form a central focus of this module. Therefore the role of traditional, interpersonal, as well as modern media will be addressed. The processes of creating meaningful and effective messages for the communication of information as well as intercultural communication will also be addressed.

Information and knowledge management 701 (INY 701)

Qualification	Postgraduate
Module credits	15.00
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Semester 1

Module content

This module consists of two main sections. A theoretical framework of information and knowledge management will be addressed in section one. Section two covers the enablers of information and knowledge management. These include: leadership, corporate culture, organisational learning, strategy, laws and policies, measurement and information technology.

Research methodology 711 (INY 711)

Qualification	Postgraduate
Module credits	15.00
Programmes	BISHons Information Science BISHons Multimedia BISHons Publishing
Prerequisites	No prerequisites.
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Semester 1

Module content

Research methodology and the application thereof to resolve research problems and to create new knowledge, is a valued advantage to any student. The module is compiled with the following objectives in mind: to instruct the student in the basic principles of research and to avail them the opportunity to execute research projects in a professional manner. Students are guided from the selection of a problem to the presentation of a complete research report with practical suggestions based on a solid theoretical framework.

Information and knowledge management (I) 713 (INY 713)

Qualification	Postgraduate
Module credits	15.00
Programmes	BISHons Information Science
Service modules	Faculty of Economic and Management Sciences
Prerequisites	No prerequisites.
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Semester 1

Module content

This module consists of two main sections. A theoretical framework of information and knowledge management will be addressed in section one. Section two covers the enablers of information and knowledge management. These include: leadership, corporate culture, organisational learning, strategy, laws and policies, measurement and information technology.

Information behaviour, retrieval and organisation 714 (INY 714)

Qualification	Postgraduate
Module credits	15.00
Programmes	BISHons Information Science
Prerequisites	No prerequisites.
Contact time	8 meetings per semester
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	See departmental website

Module content

In any context, understanding of information behaviour (i.e. information activities such as information seeking, retrieval, sharing and avoidance) is essential in the design and evaluation of information retrieval and organisation systems. This includes individual and collaborative information behaviour. Traditional and contemporary theories, models and practices of information behaviour, information retrieval and information organisation are considered in a variety of contexts reflecting contemporary interest.

Information ethics 715 (INY 715)

Qualification	Postgraduate
Module credits	15.00
Programmes	BISHons Information Science
Prerequisites	No prerequisites.

Contact time	8 meetings per semester
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Semester 2

Module content

This module focuses on the main moral ethical issues pertaining to information and ICT, globalisation, privacy and knowledge flow. It covers amongst others the following fields: information and computer ethics; cyber warfare and terrorism; information philosophy; information security; privacy and the right to information; digital identity management; cyber law; e-waste; globalisation and the impact on society.

Information and knowledge management (II) 716 (INY 716)

Qualification	Postgraduate
Module credits	15.00
Programmes	BISHons Information Science
Prerequisites	INY 713
Contact time	8 meetings per semester
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Semester 2

Module content

This module offers students the opportunity to become conversant with various knowledge management programmes as well as the development, implementation and evaluation of knowledge management strategies. It introduces students to traditional and advanced knowledge management models and frameworks, a selection of knowledge management theories, knowledge management's resiliency management role, and trending issues in the field of knowledge management.

Data management 717 (INY 717)

Qualification	Postgraduate
Module credits	15.00
Programmes	BISHons Information Science
Prerequisites	No prerequisites.
Contact time	8 meetings per semester
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Semester 1

Module content

The prevalence of data in almost all aspects of today's knowledge economy requires that graduates develop specific advanced competencies and skills related to the management of data and research data. The Fourth Industrial Revolution requires well managed data of reliable quality. This module addresses topics such as big data and long tail data, data life cycles, FAIR data, data curation, data quality, data visualisation, international data management standards, legal implications, citizen science, and other related issues. The re-use of data for knowledge creation, data citation as well as the storage and long-term preservation of data and research content in repositories, will also be addressed.

Fourth industrial revolution 722 (INY 722)

Qualification	Postgraduate
Module credits	15.00
Programmes	BISHons Information Science
Prerequisites	No prerequisites.
Contact time	8 meetings per semester
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Semester 1

Module content

This module evaluates the evolution of previous industrial revolutions to the fourth industrial revolution. It compares and critiques the fourth industrial revolution in the light of concepts of the information and knowledge societies, and examines relevant themes in the literature. It also discusses the implications for knowledge workers.

Competitive intelligence (I) 726 (INY 726)

Qualification	Postgraduate
Module credits	15.00
Programmes	BISHons Information Science
Prerequisites	No prerequisites.
Contact time	8 meetings per semester
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Semester 1

Module content

This module focuses on the theory and practice of Competitive Intelligence (CI) as a strategic tool in the workplace by examining competitive intelligence as a product, process and organisation.

Competitive intelligence (II) 727 (INY 727)

Qualification	Postgraduate
Module credits	15.00
Programmes	BISHons Information Science
Prerequisites	INY 726
Contact time	8 meetings per semester
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Semester 2

Module content

The module focuses specifically on the theory and practice of (competitive) Intelligence Analysis and a variety of aspects and techniques from related disciplines which apply to intelligence analysis. The module exposes students to new (intellectually challenging) and useful methods for conducting intelligence analysis as embedded in relevant theory and practices.

Management of information centres 729 (INY 729)

Qualification	Postgraduate
Module credits	15.00
Prerequisites	No prerequisites.
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Semester 1 and Semester 2

Module content

Information centres are now regarded as similar to any other type of business organisation. It is therefore important for them to be managed in the same way that other businesses are managed. This module focuses on the management of information centres within the greater business environment and highlights areas of management that can lead to the success of the information centres. These include change management, business processes, re-engineering, strategic human resources management and the impact of technological innovation in the IT environment.

Information communication 730 (INY 730)

Qualification	Postgraduate
Module credits	15.00
Programmes	BISHons Information Science
Service modules	Faculty of Economic and Management Sciences
Prerequisites	No prerequisites.

Contact time	8 meetings per semester
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Semester 1

Module content

Informed by the participatory approach to communication this module reflects in depth on methods for the effective communication of information. In order to achieve this, the nature of information within the context of Information Science will be investigated. Thereafter, communication media will be identified and discussed and students will learn how to create a target audience profile to determine the appropriate media and content for the dissemination of information. Information and communication technologies (ICTs) and the communication of information will be investigated along with multiliteracy and media literacy. The communication of information will form a central focus of this module. Therefore the role of traditional, interpersonal, as well as modern media will be addressed. The processes of creating meaningful and effective messages for the communication of information as well as intercultural communication will also be undertaken.

Research report 734 (INY 734)

Qualification	Postgraduate
Module credits	30.00
Programmes	BISHons Information Science
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Year

Module content

Students are expected to write a research report (5 000-7 000 words) (10 000-12 000 words) on a topic to be selected in collaboration with the lecturers.

Multimedia 774 (INY 774)

Qualification	Postgraduate
Module credits	32.00
Prerequisites	No prerequisites.
Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Year

Developmental management 801 (IOB 801)

Qualification	Postgraduate
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Module credits	8.00
Prerequisites	No prerequisites.
Contact time	20 contact hours per semester
Language of tuition	Module is presented in English
Department	Engineering and Technology Management
Period of presentation	Semester 2

New ventures and entrepreneurship 801 (IOE 801)

Qualification	Postgraduate
Module credits	10.00
Programmes	MEng Engineering Management (Coursework) MEng Project Management (Coursework) MEng Technology and Innovation Management (Coursework) MSc Engineering Management (Coursework) MSc Project Management (Coursework) MSc Technology and Innovation Management (Coursework)
Prerequisites	No prerequisites.
Contact time	20 contact hours per semester
Language of tuition	Module is presented in English
Department	Engineering and Technology Management
Period of presentation	Semester 1 or Semester 2

Module content

This module aims to provide a wider understanding of the concepts and importance of entrepreneurship and the requirements and processes in commercialising technology-based ventures.

The themes include methodology in screening opportunities and understanding the commercialisation process; compiling technology entrepreneurship strategies; product development process and business model development; understanding and protecting intellectual property; funding options for entrepreneurial ventures, and understanding the scope and content of a business plan.

Internal auditing 211 (IOK 211)

Qualification	Undergraduate
Module credits	16.00
Programmes	BCom Informatics Information Systems BIT Information Systems
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	FRK 111 and FRK 121
Contact time	3 lectures per week
Language of tuition	Module is presented in English

Department	Auditing
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Period of presentation	Semester 1
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Module content

Introduction to the audit environment. Nature, objectives, history and development of internal auditing. The internal auditing profession and the role of the Institute of Internal Auditors (IIA). Ethical code and standards of internal auditors (IPPF). An organisation's internal control environment and internal control systems. Introduction to Information Technology (IT). General controls and application controls frameworks. The internal audit process and tools and techniques used during the audit Introduction to sampling.

Internal auditing 221 (IOK 221)

Qualification	Undergraduate
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Module credits	16.00
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Programmes	BCom Informatics Information Systems BIT Information Systems
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Service modules	Faculty of Engineering, Built Environment and Information Technology
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Prerequisites	IOK 211 GS
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Contact time	1 practical per week, 3 lectures per week
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Language of tuition	Module is presented in English
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Department	Auditing
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Period of presentation	Semester 2
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Module content

Introduction to corporate governance. Relationship between internal auditing and other related disciplines and individuals. Background to external auditing. Internal and external audit approaches. The identification of weaknesses, risks and controls for the revenue and procurement systems in the system. The audit of internal control systems and the audit of financial statements.

Internal auditing 311 (IOK 311)

Qualification	Undergraduate
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Module credits	20.00
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Programmes	BCom Financial Sciences BCom Informatics Information Systems BIT Information Systems
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Service modules	Faculty of Engineering, Built Environment and Information Technology
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Prerequisites	IOK 211 and IOK 221
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Contact time	1 practical per week, 3 lectures per week
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Language of tuition	Module is presented in English
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Department	Auditing
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Period of presentation Semester 1

Module content

General and application IT controls. The identification of weaknesses, risks and controls for the inventory, bank and cash systems. Statistical sampling. The audit of internal control systems and the audit of financial statements. Internal audit and external audit reports.

Internal auditing 321 (IOK 321)

Qualification Undergraduate

Module credits 20.00

Programmes [BCom Financial Sciences](#)
[BCom Informatics Information Systems](#)
[BIT Information Systems](#)

Service modules Faculty of Engineering, Built Environment and Information Technology

Prerequisites IOK 311 GS

Contact time 3 lectures per week

Language of tuition Module is presented in English

Department Auditing

Period of presentation Semester 2

Module content

The identification of weaknesses, risks and controls for the payroll system and health and safety environment. The audit of internal control systems and the audit of financial statements. Computer Assisted Audit Techniques (CAATS). Introduction to performing an operational/performance audit. Relevant legislation and other guidelines that affect the internal audit profession. Introduction to the public sector internal audit environment.

Finance and cost management 802 (IPF 802)

Qualification Postgraduate

Module credits 10.00

Programmes [MEng Project Management \(Coursework\)](#)
[MSc Project Management \(Coursework\)](#)

Prerequisites No prerequisites.

Contact time 20 contact hours per semester

Language of tuition Module is presented in English

Department Engineering and Technology Management

Period of presentation Semester 1 or Semester 2

Module content

The role of the engineer is to apply the wealth of scientific knowledge to produce products and services for the benefit of mankind. A design can demonstrate excellence in technical achievements but if the end user cannot afford it, the whole project will be one of futility. Taking into account the vast sums of money involved in the design, development of products and establishment of production facilities, poorly managed projects can seriously damage the profitability and survival of a company.

This module creates an opportunity for the learner to be acquainted with the theoretical principles and practical applications of finance and cost management aspects as applied to projects and programmes.

To achieve this objective, it is necessary to:

- Firstly, clarify the study field of engineering economics and its function in the decision-making process,
- Secondly, to understand the elementary principles of cost estimation, allocation of cost elements and, financial risk management,
- Thirdly, to understand the cost control principles in the management of a project or programme

Engineering professionalism 410 (IPI 410)

Qualification	Undergraduate
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Module credits	8.00
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Programmes

BEng Civil Engineering
BEng Civil Engineering ENGAGE
BEng Computer Engineering
BEng Computer Engineering ENGAGE
BEng Electrical Engineering
BEng Electrical Engineering ENGAGE
BEng Electronic Engineering
BEng Electronic Engineering ENGAGE
BEng Industrial Engineering
BEng Industrial Engineering ENGAGE
BEng Mechanical Engineering
BEng Mechanical Engineering ENGAGE
BEng Metallurgical Engineering
BEng Metallurgical Engineering ENGAGE
BEng Mining Engineering
BEng Mining Engineering ENGAGE

Prerequisites	No prerequisites.
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Contact time	1 other contact session per week, 2 lectures per week
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Language of tuition	Module is presented in English
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Department	Engineering and Technology Management
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Period of presentation	Semester 1
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Module content

Requirements to maintain continued competence and to keep abreast of up-to date tools and techniques. ECSA code of conduct, Continuing Professional Development, ECSA outcomes, ECSA process and reasons for registration as CEng and PrEng. Displays understanding of the system of professional development. Accepts responsibility for own actions. Displays judgment in decision making during problem solving and design. Limits decision making to area of current competence. Reason about and make judgment on ethical aspects in case study context. Discerns boundaries of competence in problem solving and design. Case studies typical of engineering practice situations in which the graduate is likely to participate.

Procurement and contract management 801 (IPJ 801)

Qualification	Postgraduate
Module credits	10.00
Programmes	MEng Project Management (Coursework) MSc Project Management (Coursework)
Prerequisites	No prerequisites.
Contact time	20 contact hours per semester
Language of tuition	Module is presented in English
Department	Engineering and Technology Management
Period of presentation	Semester 1 or Semester 2

Module content

Most projects contract out some if not all project work to other organisations or internally. Procurement is the process of selecting, contracting and acquiring goods, services or works from an external source and is thus a vital part of project management. The objective of this module is that learners are able to select and apply a meaningful and sensible procurement strategy appropriate to the project. Topics to be covered include the procurement decision; law of contract, the procurement process; various aspects of procurement planning such as procurement methods, source selection, risk allocation, contracting strategies, contract payment types, standard forms of contract; control and dispute resolution.

Project management 780 (IPK 780)

Qualification	Postgraduate
Module credits	16.00
Programmes	BEngHons Engineering and Technology Management BScHons Applied Science Mechanics: Physical Asset Management BScHons Engineering and Technology Management
Prerequisites	No prerequisites.
Contact time	20 contact hours per semester
Language of tuition	Module is presented in English
Department	Engineering and Technology Management
Period of presentation	Semester 1 and Semester 2

Module content

This module addresses basic project management concepts, principles and techniques. The module is aligned with both the U.S. Project Management Institute's Project Management Body of Knowledge (PMBok) as well as PRINCE2 methodology developed in the UK. Scheduling of projects is a core element of project management and IPK780 covers project scheduling in somewhat more detail and at a more advanced level than the other topics.

The aim of the module is to develop the learner's ability to identify and solve problems in a way that display critical thinking and the application of quantitative methods. The module focuses on project initiation, planning, monitoring and control. Specifically the development of a project plan, different scheduling techniques, earned value, decision making and basic risk management. A deliverable of the module is a project plan (including project scope, WBS, schedule, risk management plan and cash flow) for a project in the learner's work environment.

Information technology and service project management 803 (IPK 803)

Qualification	Postgraduate
Module credits	10.00
Programmes	MEng Project Management (Coursework) MSc Project Management (Coursework)
Prerequisites	No prerequisites.
Contact time	20 contact hours per semester
Language of tuition	Module is presented in English
Department	Engineering and Technology Management
Period of presentation	Semester 1 or Semester 2

Module content

IT and service project management looks at the process of planning, organising and executing projects that achieve an organisations' specific information technology (IT) and/or service goals. Given the growth of these two industries, the objective of this module is that learners gain a practical and theoretical foundation for managing IT and service projects, while also being exposed to the latest trends, innovations and techniques (e.g. Agile) in these two related management fields. At the completion of this module learners will have gained the knowledge and skills to lead effectively and creatively by using systems thinking to solve challenges in IT product and/or service design, development, and innovation.

Thesis: Project management 990 (IPK 990)

Qualification	Postgraduate
Module credits	360.00
Programmes	PhD Project Management
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Engineering and Technology Management
Period of presentation	Year

Programme and portfolio management 801 (IPM 801)

Qualification	Postgraduate
Module credits	10.00
Prerequisites	No prerequisites.
Contact time	20 contact hours per semester
Language of tuition	Module is presented in English
Department	Engineering and Technology Management
Period of presentation	Semester 1 or Semester 2

Module content

This module introduces programmes, portfolios, the basics of corporate strategy, as well as the processes that link projects to strategy.

The processes include: screening and selection of projects; portfolio design for strategic fit and balance; allocation (and scheduling) of funds and other key resources to selected projects; the interface to detailed planning, execution, and gate reviews; as well as benefit assessment of individual projects and programmes. Attention is paid to the roles of PM methodologies, front-end loading, feasibility studies and business cases in the process of project screening, as well as to techniques used to assess projects individually and relative to one another.

The roles of individuals and groups such as the Corporate Board, executives, steering committees/review boards, a project management office, a project portfolio manager and the project sponsor in the processes that link strategy and individual projects are described.

Programme and portfolio management 802 (IPM 802)

Qualification	Postgraduate
Module credits	10.00
Programmes	MEng Engineering Management (Coursework) MEng Project Management (Coursework) MEng Technology and Innovation Management (Coursework) MSc Engineering Management (Coursework) MSc Project Management (Coursework) MSc Technology and Innovation Management (Coursework)
Prerequisites	No prerequisites.
Contact time	20 contact hours per semester
Language of tuition	Module is presented in English
Department	Engineering and Technology Management
Period of presentation	Semester 1 or Semester 2

Module content

This module introduces programmes, portfolios, the basics of corporate strategy, as well as the processes that link projects to strategy.

The processes include: screening and selection of projects; portfolio design for strategic fit and balance; allocation (and scheduling) of funds and other key resources to selected projects; the interface to detailed planning, execution, and gate reviews; as well as benefit assessment of individual projects and programmes. Attention is paid to the roles of PM methodologies, front-end loading, feasibility studies and business cases in the process of project screening, as well as to techniques used to assess projects individually and relative to one another.

The roles of individuals and groups such as the Corporate Board, executives, steering committees/review boards, a project management office, a project portfolio manager and the project sponsor in the processes that link strategy and individual projects are described.

Production and operations management 801 (IPP 801)

Qualification	Postgraduate
Module credits	10.00
Programmes	MEng Engineering Management (Coursework) MSc Engineering Management (Coursework)
Prerequisites	No prerequisites.
Contact time	20 contact hours per semester
Language of tuition	Module is presented in English
Department	Engineering and Technology Management
Period of presentation	Semester 1 or Semester 2

Module content

This module presents an integrated perspective on the central role of production and operations (manufacturing and services) within industrial enterprises and covers the spectrum of systems, products and services. Firstly, the module deals with the role of the production and operations function in the enterprise and its interaction with the other functions in the organisation, emphasising aspects like customer requirements, competitiveness and measurements. An overview of the different types of production/operations processes is also provided. Secondly, the basic elements within the POM environment are covered in detail and include day-to-day operations management decisions, master planning consisting of demand management, production and capacity planning and the master production schedule, in/outsourcing, scheduling and inventory reduction. TOC with its foundation as a continuous improvement management approach is central to the module. The aim is to supply the student with background knowledge to understand the principles of production and operations management applicable to all industries and types of organisations.

Quality and integration management 801 (IQM 801)

Qualification	Postgraduate
Module credits	10.00
Programmes	MEng Project Management (Coursework) MSc Project Management (Coursework)

Prerequisites	No prerequisites.
Contact time	20 contact hours per semester
Language of tuition	Module is presented in English
Department	Engineering and Technology Management
Period of presentation	Semester 1 or Semester 2

Module content

The module details the quality journey in projects and how all project knowledge areas are integrated into a final project plan to ensure the quality of project management. It further addresses the quality of the project's products through the proper definition of the project business case, scope definition and the breakdown of the project's products into manageable deliverables that will meet stakeholder expectations. Though specification development of the deliverables using quality planning (QP) techniques, the quality metrics or quality measurement criteria for the specification will be established. These criteria will form part of the project's quality assurance plan (QAC) which is integrated with the project's life cycle and schedule as well as management and approval authorities. Quality control (QC) and quality assurance (QA) processes and activities to test, verify and audit product, support as well as managerial processes and deliverables are also discussed and non-conforming elements are recommended for improvement through the use of quality improvement tools and techniques. The use of quality standards and methodologies to enhance the quality of projects is also discussed. The module concludes with the development of an integrated project plan, incorporation all knowledge areas addressed in the different modules of the programme.

Risk management 801 (IRI 801)

Qualification	Postgraduate
Module credits	10.00
Programmes	MEng Engineering Management (Coursework) MEng Project Management (Coursework) MEng Technology and Innovation Management (Coursework) MSc Engineering Management (Coursework) MSc Project Management (Coursework) MSc Technology and Innovation Management (Coursework)
Prerequisites	No prerequisites.
Contact time	20 contact hours per semester
Language of tuition	Module is presented in English
Department	Engineering and Technology Management
Period of presentation	Semester 1 or Semester 2

Module content

This module focuses on insight in the field of risk management and the application of the basic principles of risk identification, assessment, treatment and control in the business enterprise and also systems technology innovation and project management. Theory and practice are important and a number of case studies are used to illustrate the application of risk management in various functional areas of the enterprise. Risk can be defined as "the presence of adverse events or conditions that can threaten the survival of the system, or prevent the objectives of the system to be achieved". All systems including project or technology systems, natural and human-made, are exposed to risk and this risk should be managed in a responsible way by any business enterprise. The risk exposure of modern organisations is increasing due to complex technical systems, resource structures, processes and interactions. The risk management process involves establishing the goals and objectives for the organisation or functional unit, identifying the risks, quantifying and prioritising the risks, developing responses to the high priority risks, and monitoring the operations. Business enterprises in the manufacturing and service industries have a number of functional areas and processes that are interlinked. Risk management and decision analysis are therefore applied in development of new products or services, operations, maintenance, projects, safety and security. The module also includes aspects of detailed risk analysis such as risk simulation, etc.

Research project 780 (ISC 780)

Qualification	Postgraduate
Module credits	32.00
Programmes	BScHons Engineering and Technology Management
Contact time	20 contact hours
Language of tuition	Module is presented in English
Department	Engineering and Technology Management
Period of presentation	Semester 1 and Semester 2

Module content

The research project is the capstone of the MOT programme. It comprises an independent research study into an area of technology management, applying the principles learned during the programme. Although this is a research project of limited breadth and scope, it nonetheless has to comply with the requirements of scientific research on post-graduate level. The total volume of work that is to be invested in this module by an average student must be 320 hours. Normal requirements for assessment that include the use of an external examiner apply to this module.

Mini-dissertation 898 (ISC 898)

Qualification	Postgraduate
Module credits	90.00
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Engineering and Technology Management
Period of presentation	Year

Module content

A research project on a topic of the student's choice from any of the modules offered by the Graduate School of Technology Management is done. The work takes place under the supervision of a study leader (project adviser). In addition to the satisfactory completion of the report itself, the student also has to prepare an article based on the project and present it at the final-year symposium held during November each year. Evaluation is based on the report content, article, as well as the presentation. A follow-up symposium is also held during May in the next year.

Mini-dissertation 899 (ISC 899)

Qualification	Postgraduate
Module credits	90.00
Programmes	MSc Engineering Management (Coursework) MSc Project Management (Coursework) MSc Technology and Innovation Management (Coursework)
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Engineering and Technology Management
Period of presentation	Year

Module content

A research project on a topic of the student's choice from any of the modules offered by the Graduate School of Technology Management is done. The work takes place under the supervision of a study leader (project adviser). In addition to the satisfactory completion of the report itself, the student also has to prepare an article based on the project and present it at the final-year symposium held during November each year. Evaluation is based on the report content, article, as well as the presentation. A follow-up symposium is also held during May in the next year.

Systems thinking and engineering 780 (ISE 780)

Qualification	Postgraduate
Module credits	16.00
Programmes	BEngHons Engineering and Technology Management BScHons Applied Science Mechanics: Physical Asset Management BScHons Engineering and Technology Management BScHons Financial Engineering
Service modules	Faculty of Natural and Agricultural Sciences
Prerequisites	No prerequisites.
Contact time	20 contact hours per semester
Language of tuition	Module is presented in English
Department	Engineering and Technology Management
Period of presentation	Semester 1 and Semester 2

Module content

A company's ability to remain competitive in modern times hinges increasingly on its ability to perform systems engineering. The technology and complexity of a company's products appears to steadily increase and with it, the risks that need to be managed. This module provides specialised knowledge to apply systems engineering by understanding the tools, processes and management fundamentals.

Systems engineering and management 801 (ISE 801)

Qualification	Postgraduate
Module credits	10.00
Programmes	MEng Engineering Management (Coursework) MSc Engineering Management (Coursework)
Prerequisites	No prerequisites.
Contact time	20 contact hours per semester
Language of tuition	Module is presented in English
Department	Engineering and Technology Management
Period of presentation	Semester 1 or Semester 2

Module content

SE & M is discussed within the context of the technology-based enterprise. The first objective is to conceptualise and model a tech-based enterprise in terms of core business processes and the interaction amongst them. SE processes are hence defined and managed in the context of the project and organisation. The concepts of “system, project and process” are explained.

The design and development of the total system for the total system life-cycle, taking into account the requirements of all stakeholders, is the heart of SE. SE & M focuses on the management of the SE process and the establishment of a SE capability in the organisation.

All stakeholders and their requirements are identified, analysed, described and managed over time. The system life-cycle stages/phases and related system design processes are focused upon. A number of “specialty engineering topics”, e.g. information and configuration management, life-cycle cost, quality of design, downstream “design to” requirements and logistics are touched on. The enabling role of SE within Engineering Management is emphasised.

Project systems engineering 802 (ISE 802)

Qualification	Postgraduate
Module credits	10.00
Programmes	MEng Project Management (Coursework) MSc Project Management (Coursework)
Prerequisites	No prerequisites.
Contact time	20 contact hours per semester
Language of tuition	Module is presented in English
Department	Engineering and Technology Management

Period of presentation	Semester 1 or Semester 2
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Module content

The PSE process is discussed within the context of the technology-based enterprise. The first objective is to conceptualise and model a tech-based enterprise in terms of core business processes and the interaction amongst them. SE processes are hence understood in the context of the project and organisation. The concepts of “system, project and process” are explained.

The design and development of the total system for the total system life-cycle, taking into account the requirements of all stakeholders is the heart of PSE.

All stakeholders and their requirements are identified, described and managed over time. The system life-cycle stages/phases and related system design processes are focused upon. A number of SE topics, e.g. information and configuration management, life-cycle cost, quality of design, downstream “design to” requirements and logistics are touched on. SE planning within the bigger project plan is investigated. The important and integrating role of the project manager to make SE successful, particularly in the early phases of the project, is highlighted.

Strategic management 801 (ISM 801)

Qualification	Postgraduate
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Module credits	10.00
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Programmes	MEng Engineering Management (Coursework) MSc Engineering Management (Coursework)
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Prerequisites	No prerequisites.
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Contact time	20 contact hours per semester
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Language of tuition	Module is presented in English
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Department	Engineering and Technology Management
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Period of presentation	Semester 1 or Semester 2
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Module content

The objective with this module is to stimulate strategic thinking and the development of strategic decision making skills amongst students in the field of strategic management in an engineering environment. In this module the following topics are addressed:

Concepts and practice of strategy: An historical background serves as introduction. Classical concepts and misconceptions in strategic and operational management work are given.

The process of strategic management: The work content and structure of strategic management are discussed. A schematic model of the process is developed.

Formulation of Strategy: This section gives a statement of the work to be done in formulation of strategy. The following aspects are covered: The company mission. External environment. Environmental forecasting. The company SWOT analysis. Formulating objectives and grand strategies. Strategic analysis and choice.

Implementation of strategy: In the concluding part of the module attention is given to implementation through business functions, structure, leadership and culture, rewards, control mechanisms for measuring, evaluating and corrective actions.

Strategic project management 804 (ISM 804)

Qualification	Postgraduate
Module credits	10.00
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Engineering and Technology Management
Period of presentation	Semester 1 or Semester 2

Condition-based maintenance 832 (ISM 832)

Qualification	Postgraduate
Module credits	32.00
Prerequisites	No prerequisites.
Contact time	10 lectures per week
Language of tuition	Module is presented in English
Department	Engineering and Technology Management
Period of presentation	Semester 1

Science, technology and innovation policy 880 (ISP 880)

Qualification	Postgraduate
Module credits	10.00
Programmes	MEng Technology and Innovation Management (Coursework) MSc Technology and Innovation Management (Coursework)
Prerequisites	No prerequisites.
Contact time	20 contact hours per semester
Language of tuition	Module is presented in English
Department	Engineering and Technology Management
Period of presentation	Semester 1 or Semester 2

Module content

Science, Technology & Innovation (STI) policy is about decisions and actions that are taken by governments in order to promote research, technology development and innovation which are critical to economic growth and development, as well as the procurement and use of scientific knowledge in public policy-making. In this module students will be introduced to concepts of and issues in STI policy, followed by a brief history of innovation theory and how STI are critical to economic productivity and development. The range of policy instruments which can be used to stimulate STI will also be reviewed, as well as the characterisation of the instruments which have been adopted by African countries. A range of frameworks for assessing the effectiveness of different STI policies and innovation systems, with particular reference to South Africa and other African countries, forms part of this module.

Strategic technology and innovation management 880 (IST 880)

Qualification	Postgraduate
Module credits	10.00
Programmes	MEng Technology and Innovation Management (Coursework) MSc Technology and Innovation Management (Coursework)
Prerequisites	No prerequisites.
Contact time	20 contact hours per semester
Language of tuition	Module is presented in English
Department	Engineering and Technology Management
Period of presentation	Semester 1 or Semester 2

Module content

The objective of this module is to provide students with the necessary skills to develop technology and innovation strategies for organisations. Themes include the concepts of technology and innovation strategy, processes of strategic management, formulation of technology and innovation strategies, strategy implementation, technology roadmapping, scenario development and future thinking. Appropriate case studies are used to link the theory and practice.

Dissertation: Information systems 890 (ISY 890)

Qualification	Postgraduate
Module credits	180.00
Programmes	MIT Information Systems
Language of tuition	Module is presented in English
Department	Informatics
Period of presentation	Year

Thesis: Information Systems 990 (ISY 990)

Qualification	Postgraduate
Module credits	360.00
Programmes	PhD Information Systems
Language of tuition	Module is presented in English
Department	Informatics
Period of presentation	Year

Technology management 801 (ITB 801)

Qualification	Postgraduate
Module credits	10.00

Programmes	MEng Engineering Management (Coursework) MSc Engineering Management (Coursework)
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Prerequisites	No prerequisites.
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Contact time	20 contact hours per semester
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Language of tuition	Module is presented in English
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Department	Engineering and Technology Management
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Period of presentation	Semester 1 or Semester 2
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Module content

Technology is important for an organisation's competitiveness and productivity. Technology management is therefore an important function within any organisation, whether it is as a core resource of technology-based companies or as a support resource in service organisations. Technology is present over the whole lifecycle of projects and operations with technology management activities such as identification, selection, acquisition, learning, exploitation and protection. The module therefore addresses themes such as technology dynamics; technology identification; technology audits; technology selection; technology road-mapping; technology acquisition; technology adoption; technology management in the operational lifecycle.

Fundamentals of technology management 802 (ITB 802)

Qualification	Postgraduate
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Module credits	10.00
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Programmes	MEng Technology and Innovation Management (Coursework) MSc Technology and Innovation Management (Coursework)
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Prerequisites	No prerequisites.
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Contact time	20 contact hours per semester
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Language of tuition	Module is presented in English
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Department	Engineering and Technology Management
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Period of presentation	Semester 1 or Semester 2
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Module content

Technology is often seen as the engine of economic growth. Technology management is therefore an important function within any organisation. Technology is present over the whole lifecycle of innovation projects and its activities. The typical technology management activities are Identification, Selection, Acquisition, Learning, Exploitation and Protection. Organisations should be able to master this portfolio of technology management activities to be competitive, especially in a technology and innovation environment. The module therefore addresses themes such as Technology Intelligence and Scanning, Technology Forecasting, Emerging Technologies, Technological capability assessment and development, R&D Management, Technology Transfer, Technology Planning, and Roadmapping and Technology Protection.

Dissertation: Technology and innovation management 890 (ITB 890)

Qualification	Postgraduate
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Module credits	180.00
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Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Engineering and Technology Management
Period of presentation	Year

Dissertation: Technology management 891 (ITB 891)

Qualification	Postgraduate
Module credits	180.00
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Engineering and Technology Management
Period of presentation	Year

Dissertation: Technology and innovation management 895 (ITB 895)

Qualification	Postgraduate
Module credits	180.00
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Engineering and Technology Management
Period of presentation	Year

Mini-dissertation 896 (ITB 896)

Qualification	Postgraduate
Module credits	64.00
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Engineering and Technology Management
Period of presentation	Year

Thesis: Technology and innovation management 990 (ITB 990)

Qualification	Postgraduate
Module credits	360.00
Programmes	PhD Technology and Innovation Management
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Engineering and Technology Management

Period of presentation	Year
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Technology and innovation management 780 (ITI 780)

Qualification	Postgraduate
Module credits	16.00
Prerequisites	No prerequisites.
Contact time	20 contact hours per semester
Language of tuition	Module is presented in English
Department	Engineering and Technology Management
Period of presentation	Semester 1

Operations management 781 (IVV 781)

Qualification	Postgraduate
Module credits	16.00
Programmes	BEngHons Engineering and Technology Management BScHons Engineering and Technology Management
Prerequisites	No prerequisites.
Contact time	20 contact hours per semester
Language of tuition	Module is presented in English
Department	Engineering and Technology Management
Period of presentation	Semester 1 or Semester 2

Module content

Operations management develops the ability of students to think about the transformation processes in organisations in a global way. The emphasis is on learning how to improve operating systems significantly through maximising throughput and minimising costs. The understanding of operating systems is developed from a flow- as well as an effect-cause-effect perspective.

Community-based project 201 (JCP 201)

Qualification	Undergraduate
Module credits	8.00
Programmes	BCom Informatics Information Systems BSc Architecture BSc Construction Management BSc Interior Architecture BSc Landscape Architecture BSc Quantity Surveying BSc Real Estate BTRP
Prerequisites	No prerequisites.

Contact time	1 other contact session per week
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Language of tuition	Module is presented in English
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Department	Informatics
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Period of presentation	Year
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Module content

This project-orientated module is a form of applied learning which is directed at specific community needs and is integrated into all undergraduate academic programmes offered by the Faculty of Engineering, Built Environment and Information Technology. The main objectives with the module are as follows:

(1) The execution of a community related project aimed at achieving a beneficial impact on a chosen section of society, preferably but not exclusively, by engagement with a section of society which is different from the student's own social background.

(2) The development of an awareness of personal, social and cultural values, an attitude to be of service, and an understanding of social issues, for the purpose of being a responsible professional.

(3) The development of important multidisciplinary and life skills, such as communication, interpersonal and leadership skills.

Assessment in the module will include all or most of the following components: evaluation and approval of project proposal, assessment of oral and/or written progress reports, peer assessment in the event of team projects, written reportback by those at which the project was aimed at, and final assessment on grounds of the submission of a portfolio and a written report.

Community-based project 202 (JCP 202)

Qualification	Undergraduate
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Module credits	8.00
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Programmes	BIS Information Science BIS Multimedia BIS Publishing BIT Information Systems BSc Computer Science BSc Information and Knowledge Systems
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Service modules	Faculty of Economic and Management Sciences
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Prerequisites	No prerequisites.
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Contact time	1 other contact session per week
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Language of tuition	Module is presented in English
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Department	Informatics
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Period of presentation	Year
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Module content

This project-orientated module is a form of applied learning which is directed at specific community needs and is integrated into all undergraduate academic programmes offered by the Faculty of Engineering, Built Environment and Information Technology.

The main objectives with the module are as follows:

- (1) The execution of a community-related project aimed at achieving a beneficial impact on a chosen section of society, preferably but not exclusively, by engagement with a section of society which is different from the student's own background.
- (2) The development of an awareness of personal, social and cultural values, an attitude to be of service, and an understanding of social issues, for the purpose of being a responsible professional.
- (3) The development of important multidisciplinary and life skills, such as communication, interpersonal and leadership skills.

Assessment in this module will include all or most of the following components: evaluation and approval of the project proposal, assessment of oral and/or written progress reports, peer assessment in the event of team projects, written report-back by those at which the project was aimed at, and final assessment on grounds of the submission of a portfolio and a written report.

Community-based project 203 (JCP 203)

Qualification	Undergraduate
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Module credits	8.00
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Programmes	BEng Chemical Engineering BEng Chemical Engineering ENGAGE BEng Civil Engineering BEng Civil Engineering ENGAGE BEng Computer Engineering BEng Computer Engineering ENGAGE BEng Electrical Engineering BEng Electrical Engineering ENGAGE BEng Electronic Engineering BEng Electronic Engineering ENGAGE BEng Industrial Engineering BEng Industrial Engineering ENGAGE BEng Mechanical Engineering BEng Mechanical Engineering ENGAGE BEng Metallurgical Engineering BEng Metallurgical Engineering ENGAGE BEng Mining Engineering BEng Mining Engineering ENGAGE
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Prerequisites	No prerequisites.
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Contact time	1 lecture per week
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Language of tuition	Module is presented in English
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Department	Informatics
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Period of presentation	Year
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Module content

This module is integrated into all undergraduate academic programmes offered by the Faculty. Main objectives: execution of a community project aimed at achieving a beneficial impact on a section of society; awareness of personal, social and cultural values and an understanding of social issues; and development of life skills.

Assessment: project proposal, written progress reports, peer assessment, assessment by community, presentation, report presented in the form of a blog.

Professional orientation 110 (JPO 110)

Qualification	Undergraduate
Module credits	8.00
Programmes	BEng Chemical Engineering ENGAGE BEng Civil Engineering ENGAGE BEng Computer Engineering ENGAGE BEng Electrical Engineering ENGAGE BEng Electronic Engineering ENGAGE BEng Industrial Engineering ENGAGE BEng Mechanical Engineering ENGAGE BEng Metallurgical Engineering ENGAGE BEng Mining Engineering ENGAGE
Prerequisites	No prerequisites.
Contact time	3 lectures per week, 3 tutorials per week, Foundation Course
Language of tuition	Module is presented in English
Department	EBIT Deans Office
Period of presentation	Semester 1

Module content

A project-based approach is followed to equip students with academic and IT skills to succeed within the School of Engineering at UP.

Additional Chemistry 1 111 (JPO 111)

Qualification	Undergraduate
Module credits	8.00
Programmes	BEng Chemical Engineering ENGAGE BEng Civil Engineering ENGAGE BEng Electrical Engineering ENGAGE BEng Electronic Engineering ENGAGE BEng Metallurgical Engineering ENGAGE BEng Mining Engineering ENGAGE
Prerequisites	No prerequisites.
Contact time	1 lecture per week, 3 tutorials per week, Foundation Course
Language of tuition	Module is presented in English
Department	EBIT Deans Office

Period of presentation	Semester 1
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Module content

Background knowledge, problem-solving skills, conceptual understanding and chemical reasoning skills required by CHM 171/172.

Additional Electricity and electronics 112 (JPO 112)

Qualification	Undergraduate
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Module credits	8.00
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Programmes	BEng Chemical Engineering ENGAGE BEng Civil Engineering ENGAGE BEng Computer Engineering ENGAGE BEng Electrical Engineering ENGAGE BEng Electronic Engineering ENGAGE BEng Industrial Engineering ENGAGE BEng Mechanical Engineering ENGAGE BEng Metallurgical Engineering ENGAGE BEng Mining Engineering ENGAGE
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Prerequisites	No prerequisites.
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Contact time	1 lecture per week, 3 tutorials per week, Foundation Course
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Language of tuition	Module is presented in English
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Department	EBIT Deans Office
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Period of presentation	Semester 1
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Module content

Background knowledge, problem-solving skills, conceptual understanding and reasoning skills required by EBN 111/122.

Additional Graphical communication 113 (JPO 113)

Qualification	Undergraduate
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Module credits	8.00
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Programmes	BEng Chemical Engineering ENGAGE BEng Civil Engineering ENGAGE BEng Electrical Engineering ENGAGE BEng Electronic Engineering ENGAGE BEng Industrial Engineering ENGAGE BEng Mechanical Engineering ENGAGE BEng Metallurgical Engineering ENGAGE BEng Mining Engineering ENGAGE
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Prerequisites	No prerequisites.
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Contact time	1 lecture per week, 3 tutorials per week, Foundation Course
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Language of tuition	Module is presented in English
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Department	School of Engineering
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Period of presentation	Semester 1
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Module content

Background knowledge, conceptual understanding, drawing skills and reasoning skills required by MGC 110.

Additional Programming 1 114 (JPO 114)

Qualification	Undergraduate
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Module credits	8.00
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Programmes	BEng Computer Engineering ENGAGE
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Prerequisites	No prerequisites.
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Contact time	1 lecture per week, 3 tutorials per week, Foundation Course
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Language of tuition	Module is presented in English
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Department	EBIT Deans Office
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Period of presentation	Semester 1
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Module content

Background knowledge, problem-solving skills, conceptual understanding and reasoning skills required by COS 132.

Additional Mathematical statistics 115 (JPO 115)

Qualification	Undergraduate
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Module credits	8.00
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Prerequisites	No prerequisites.
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Contact time	1 lecture per week, 3 tutorials per week, Foundation Course
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Language of tuition	Module is presented in English
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Department	School of Engineering
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Period of presentation	Semester 1
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Module content

Background knowledge, conceptual understanding, problem-solving skills and reasoning skills required by WST 111.

Additional Mathematics 1 116 (JPO 116)

Qualification	Undergraduate
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Module credits	8.00
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Programmes	BEng Chemical Engineering ENGAGE
	BEng Civil Engineering ENGAGE
	BEng Computer Engineering ENGAGE
	BEng Electrical Engineering ENGAGE
	BEng Electronic Engineering ENGAGE
	BEng Industrial Engineering ENGAGE
	BEng Mechanical Engineering ENGAGE
	BEng Metallurgical Engineering ENGAGE
	BEng Mining Engineering ENGAGE

Prerequisites	No prerequisites.
Contact time	1 lecture per week, 3 tutorials per week, Foundation Course
Language of tuition	Module is presented in English
Department	EBIT Deans Office
Period of presentation	Semester 1

Module content

Background knowledge, problem-solving skills, conceptual understanding and mathematical reasoning skills required by WTW 158.

Professional orientation 120 (JPO 120)

Qualification	Undergraduate
Module credits	8.00

Programmes	BEng Chemical Engineering ENGAGE
	BEng Civil Engineering ENGAGE
	BEng Computer Engineering ENGAGE
	BEng Electrical Engineering ENGAGE
	BEng Electronic Engineering ENGAGE
	BEng Industrial Engineering ENGAGE
	BEng Mechanical Engineering ENGAGE
	BEng Metallurgical Engineering ENGAGE
	BEng Mining Engineering ENGAGE

Prerequisites	A mark of between 45% and 49% for JPO 110.
Contact time	3 lectures per week, 3 tutorials per week, Foundation Course
Language of tuition	Module is presented in English
Department	EBIT Deans Office
Period of presentation	Semester 2

Module content

A project-based approach is followed to equip students with academic and IT skills to succeed within the School of Engineering at UP.

Additional Chemistry 2 121 (JPO 121)

Qualification	Undergraduate
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Module credits	8.00
Programmes	BEng Chemical Engineering ENGAGE
Prerequisites	No prerequisites.
Contact time	1 lecture per week, 3 tutorials per week, Foundation Course
Language of tuition	Module is presented in English
Department	School of Engineering
Period of presentation	Semester 2

Module content

Background knowledge, problem-solving skills, conceptual understanding and chemical reasoning skills required by CHM 181.

Additional Physics 122 (JPO 122)

Qualification	Undergraduate
Module credits	8.00
Programmes	BEng Chemical Engineering ENGAGE BEng Civil Engineering ENGAGE BEng Electrical Engineering ENGAGE BEng Electronic Engineering ENGAGE BEng Metallurgical Engineering ENGAGE BEng Mining Engineering ENGAGE
Prerequisites	No prerequisites.
Contact time	1 lecture per week, 3 tutorials per week, Foundation Course
Language of tuition	Module is presented in English
Department	EBIT Deans Office
Period of presentation	Semester 2

Module content

Background knowledge, problem-solving skills, conceptual understanding and physical reasoning skills required by FSK 116/176.

Additional Materials science 123 (JPO 123)

Qualification	Undergraduate
Module credits	8.00

Programmes	BEng Civil Engineering ENGAGE
	BEng Computer Engineering ENGAGE
	BEng Electrical Engineering ENGAGE
	BEng Electronic Engineering ENGAGE
	BEng Industrial Engineering ENGAGE
	BEng Mechanical Engineering ENGAGE
	BEng Metallurgical Engineering ENGAGE
	BEng Mining Engineering ENGAGE

Prerequisites	No prerequisites.
Contact time	1 lecture per week, 3 tutorials per week, Foundation Course
Language of tuition	Module is presented in English
Department	EBIT Deans Office
Period of presentation	Semester 2

Module content
Background knowledge, problem-solving skills, conceptual understanding and reasoning skills required by NMC 113/123.

Additional Programming 2 124 (JPO 124)

Qualification	Undergraduate
Module credits	8.00
Programmes	BEng Computer Engineering ENGAGE
Prerequisites	No prerequisites.
Contact time	1 lecture per week, 3 tutorials per week, Foundation Course
Language of tuition	Module is presented in English
Department	School of Engineering
Period of presentation	Semester 2

Module content
Background knowledge, problem-solving skills, conceptual understanding and reasoning skills required by COS 110.

Additional Mechanics 125 (JPO 125)

Qualification	Undergraduate
Module credits	8.00

Programmes	BEng Chemical Engineering ENGAGE
	BEng Civil Engineering ENGAGE
	BEng Computer Engineering ENGAGE
	BEng Electrical Engineering ENGAGE
	BEng Electronic Engineering ENGAGE
	BEng Industrial Engineering ENGAGE
	BEng Mechanical Engineering ENGAGE
	BEng Metallurgical Engineering ENGAGE
	BEng Mining Engineering ENGAGE

Prerequisites	No prerequisites.
Contact time	1 lecture per week, 3 tutorials per week, Foundation Course
Language of tuition	Module is presented in English
Department	EBIT Deans Office
Period of presentation	Semester 2

Module content

Background knowledge, problem-solving skills, conceptual understanding and reasoning skills required by SWK 122.

Additional Mathematics 2 126 (JPO 126)

Qualification	Undergraduate
Module credits	8.00

Programmes	BEng Chemical Engineering ENGAGE
	BEng Civil Engineering ENGAGE
	BEng Computer Engineering ENGAGE
	BEng Electrical Engineering ENGAGE
	BEng Electronic Engineering ENGAGE
	BEng Industrial Engineering ENGAGE
	BEng Mechanical Engineering ENGAGE
	BEng Metallurgical Engineering ENGAGE
	BEng Mining Engineering ENGAGE

Prerequisites	No prerequisites.
Contact time	1 lecture per week, 3 tutorials per week, Foundation Course
Language of tuition	Module is presented in English
Department	EBIT Deans Office
Period of presentation	Semester 2

Module content

Background knowledge, problem-solving skills, conceptual understanding and mathematical reasoning skills required by WTW 164.

Additional Computers 127 (JPO 127)

Qualification	Undergraduate
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Module credits	8.00
Prerequisites	No prerequisites.
Contact time	1 lecture per week, 3 tutorials per week, Foundation Course
Language of tuition	Module is presented in English
Department	School of Engineering
Period of presentation	Semester 2

Module content

Background knowledge, problem-solving skills, conceptual understanding and reasoning skills required by COS 222.

Additional Physics 152 (JPO 152)

Qualification	Undergraduate
Module credits	8.00
Programmes	BEng Computer Engineering ENGAGE BEng Industrial Engineering ENGAGE BEng Mechanical Engineering ENGAGE
Prerequisites	No prerequisites.
Contact time	1 lecture per week, 3 tutorials per week, Foundation Course
Language of tuition	Module is presented in English
Department	School of Engineering
Period of presentation	Semester 1

Module content

Background knowledge, problem-solving skills, conceptual understanding and reasoning skills required by FSK116/176.

Additional Chemistry 1 161 (JPO 161)

Qualification	Undergraduate
Module credits	8.00
Programmes	BEng Industrial Engineering ENGAGE BEng Mechanical Engineering ENGAGE
Prerequisites	No prerequisites.
Contact time	1 lecture per week, 3 tutorials per week, Foundation Course
Language of tuition	Module is presented in English
Department	School of Engineering
Period of presentation	Semester 2

Module content

Background knowledge, problem-solving skills, conceptual understanding and reasoning skills required by CHM 171/172.

Construction management 310 (KBS 310)

Qualification	Undergraduate
Module credits	10.00
Programmes	BSc Construction Management
Prerequisites	No prerequisites.
Contact time	3 lectures per week
Language of tuition	Afrikaans and English are used in one class
Department	Construction Economics
Period of presentation	Semester 1

Module content

General functions and techniques of management.

Construction management 320 (KBS 320)

Qualification	Undergraduate
Module credits	10.00
Programmes	BSc Construction Management
Prerequisites	No prerequisites.
Contact time	3 lectures per week
Language of tuition	Afrikaans and English are used in one class
Department	Construction Economics
Period of presentation	Semester 2

Module content

The fundamentals and basic applications of procurement management.

Construction management 710 (KBS 710)

Qualification	Postgraduate
Module credits	10.00
Programmes	BScHons Construction Management BScHons Real Estate Retail Property
Prerequisites	No prerequisites.
Contact time	3 lectures per week
Language of tuition	Module is presented in English

Department	Construction Economics
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Period of presentation	Semester 1
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Module content

Operational management techniques, productivity, work study and effect on price determination. Construction programming techniques, including CCS.

Construction management 720 (KBS 720)

Qualification	Postgraduate
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Module credits	10.00
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Programmes	BScHons Construction Management
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Prerequisites	No prerequisites.
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Contact time	3 lectures per week
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Language of tuition	Module is presented in English
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Department	Construction Economics
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Period of presentation	Semester 2
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Module content

Human resource management as tool to achieve objectives. An approved certificate in first aid has to be submitted before this module will be awarded.

Research report 785 (KBS 785)

Qualification	Postgraduate
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Module credits	30.00
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Programmes	BScHons Construction Management
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Prerequisites	No prerequisites.
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Language of tuition	Module is presented in English
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Department	Construction Economics
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Period of presentation	Year
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Module content

An essay on a subject approved by the Head of Department has to be completed during the final year of study.

Construction management 803 (KBS 803)

Qualification	Postgraduate
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Module credits	10.00
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Programmes	MEng Project Management (Coursework) MSc Project Management (Coursework)
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Prerequisites	No prerequisites.
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Contact time	20 contact hours per semester
Language of tuition	Module is presented in English
Department	Construction Economics
Period of presentation	Semester 1 or Semester 2

Module content

The domain addresses the specific needs of the project manager active in the construction industry. An overview of the local and international best practise is provided. Organisational structures and role players within the construction industry are studied. The construction project management life cycle is addressed with specific reference to the design and construction processes.

Construction management 804 (KBS 804)

Qualification	Postgraduate
Module credits	10.00
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Construction Economics
Period of presentation	Semester 1

Construction management 805 (KBS 805)

Qualification	Postgraduate
Module credits	10.00
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Construction Economics
Period of presentation	Semester 2

Dissertation: Construction management 891 (KBS 891)

Qualification	Postgraduate
Module credits	180.00
Programmes	MSc Construction Management
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Construction Economics
Period of presentation	Year

Thesis: Construction management 990 (KBS 990)

Qualification	Postgraduate
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Module credits	360.00
Programmes	PhD Construction Management
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Construction Economics
Period of presentation	Year

Construction entrepreneurship 720 (KEN 720)

Qualification	Postgraduate
Module credits	8.00
Programmes	BScHons Construction Management BScHons Quantity Surveying BScHons Real Estate
Prerequisites	No prerequisites.
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Construction Economics
Period of presentation	Semester 2

Module content

Entrepreneurship, strategic management, business ethics, effective business management. Attention is paid to the built environment practitioner in this context.

Construction entrepreneurship 740 (KEN 740)

Qualification	Postgraduate
Module credits	9.00
Prerequisites	No prerequisites.
Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	Construction Economics
Period of presentation	Semester 2

Module content

Entrepreneurship, strategic management and marketing. Business ethics.

Introduction to construction contract law 322 (KKR 322)

Qualification	Undergraduate
Module credits	8.00

Programmes	BSc Architecture BSc Construction Management BSc Interior Architecture BSc Landscape Architecture BSc Quantity Surveying BSc Real Estate
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Prerequisites	No prerequisites.
Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	Construction Economics
Period of presentation	Semester 2

Module content

An introduction to the principles of construction contract law and an overview of standardised conditions of contract for the built environment.

Construction contract law 730 (KKR 730)

Qualification	Postgraduate
Module credits	12.00
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Construction Economics
Period of presentation	Semester 1

Module content

Construction law and law of delict – an overview; history of building contracts in South Africa; JBCC principal building and nominated/selected subcontract agreements: interpretation, insurance and security, execution, completion, payment, suspension and termination, dispute resolution; JBCC minor works agreement; case studies.

Construction contract law 740 (KKR 740)

Qualification	Postgraduate
Module credits	8.00
Programmes	BScHons Construction Management BScHons Quantity Surveying BScHons Real Estate
Prerequisites	No prerequisites.
Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	Construction Economics

Period of presentation	Semester 1
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Module content

Application and terms of CIDB endorsed standard construction contracts such as GCC, NEC and FIDIC; case studies. Alternative dispute resolution: mediation, adjudication and arbitration; litigation - an overview; law of delict; negligence and damage to property.

Communication management 284 (KOB 284)

Qualification	Undergraduate
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Module credits	5.00
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Programmes	BIT Information Systems
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Contact time	3 lectures per week
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Language of tuition	Module is presented in English
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Department	Business Management
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Period of presentation	Quarter 4
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Module content

*Module content will be adapted in accordance with the appropriate degree programme. Only one of KOB 281-284 may be taken as a module where necessary for a programme.

Applied business communication skills

Acquiring basic business communication skills will enhance the capabilities of employees, managers and leaders in the business environment. An overview of applied skills on the intrapersonal, dyadic, interpersonal, group (team), organisational, public and mass communication contexts is provided. The practical part of the module (for example, the writing of business reports and presentation skills) concentrates on the performance dimensions of these skills as applied to particular professions.

Construction 111 (KON 111)

Qualification	Undergraduate
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Module credits	8.00
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Programmes	BSc Architecture BSc Interior Architecture BSc Landscape Architecture
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Prerequisites	No prerequisites.
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Contact time	3 lectures per week
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Language of tuition	Module is presented in English
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Department	Architecture
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Period of presentation	Semester 1
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Module content

The context of architectural technology and the relationships between technology, theory, structure and materials. Drawing conventions. The typical city site. The construction and materials of a single storey dwelling with masonry walls and a pitched roof, from preparation for building work to substructure, retaining walls and floors.

Construction 121 (KON 121)

Qualification	Undergraduate
Module credits	8.00
Programmes	BSc Architecture BSc Interior Architecture BSc Landscape Architecture
Prerequisites	KON 111 GS
Contact time	1 practical per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Architecture
Period of presentation	Semester 2

Module content

Continuation of the construction and materials of a single storey dwelling. Superstructure: walls, opening, roofs, finishes and services.

Construction 210 (KON 210)

Qualification	Undergraduate
Module credits	8.00
Programmes	BSc Architecture BSc Interior Architecture BSc Landscape Architecture
Prerequisites	KON 111 and KON 121
Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	Architecture
Period of presentation	Semester 1

Module content

Double-storeyed buildings: reinforced concrete, steel and timber-framed structures. Offshutter concrete. Load-bearing masonry. Low-pitch roofs and waterproofing, other pitched-roof finishes. Lightweight partitioning. Glass. Joinery. Small precast elements.

Construction 220 (KON 220)

Qualification	Undergraduate
Module credits	8.00
Programmes	BSc Architecture BSc Interior Architecture BSc Landscape Architecture
Prerequisites	KON 210 GS
Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	Architecture
Period of presentation	Semester 2

Module content

Soil mechanics: foundations, basement construction and waterproofing. Site structures: geotextiles and geomembranes, stairs, walls, retaining walls, fences, ramps, gabions, prefabricated retaining blocks. Built planters, lapas, braais, pavilions, decks.

Construction 310 (KON 310)

Qualification	Undergraduate
Module credits	12.00
Programmes	BSc Architecture BSc Interior Architecture BSc Landscape Architecture
Prerequisites	KON 210 and KON 220
Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	Architecture
Period of presentation	Semester 1

Module content

Roads: design and construction, materials and finishes, kerbing. Water features: design and construction. Street furniture. Construction equipment. Site and building services: water lines, sanitary plumbing and pipe systems above ground and indoors, underground sewer systems, electricity and gas. Electrical lighting: light, lamp types, luminaires; lighting requirements. Design application.

Construction 320 (KON 320)

Qualification	Undergraduate
Module credits	12.00
Programmes	BSc Architecture BSc Interior Architecture BSc Landscape Architecture

Prerequisites	KON 310 GS
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Architecture
Period of presentation	Semester 2

Module content

Integration of the foregoing coursework. Introduction to construction norms and standards, technical drawing practice and specifications. Cost estimates, feasibility and payability. Advanced materials: ceramics, polymers, adhesives, paint, metals, glass. Human transportation systems: types, applications. Design of a small commercial building/landscape/interior space (in DESIGN) and the preparation of its construction drawings.

Construction project management 730 (KPB 730)

Qualification	Postgraduate
Module credits	8.00
Programmes	BScHons Construction Management BScHons Quantity Surveying BScHons Real Estate
Prerequisites	No prerequisites.
Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	Construction Economics
Period of presentation	Semester 1

Module content

Fundamentals to project management in the building and property industry. Key processes, knowledge areas and techniques are covered.

Commercial law 110 (KRG 110)

Qualification	Undergraduate
Module credits	10.00
Programmes	BCom BCom Accounting Sciences BCom Investment Management BSc Information and Knowledge Systems
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Economic and Management Sciences
Prerequisites	No prerequisites.
Contact time	1 tutorial per week, 2 lectures per week
Language of tuition	Module is presented in English

Department	Mercantile Law
Period of presentation	Semester 1

Module content

General introduction.

General principles of the law of contract: introduction to the law of contract; consensus; contractual capacity; legality and physical possibility of performance; formalities; parties to the contract; conditions and related legal concepts; special terms and the interpretation of contracts; breach of contract and the termination of the contractual relationship.

Commercial law 120 (KRG 120)

Qualification	Undergraduate
Module credits	10.00
Programmes	BCom BCom Accounting Sciences BCom Investment Management BSc Information and Knowledge Systems
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Economic and Management Sciences
Prerequisites	Examination entrance to KRG 110
Contact time	1 tutorial per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Mercantile Law
Period of presentation	Semester 2

Module content

Law of purchase and sale; law of lease; credit agreements; law of agency; law of security.

Commercial law 200 (KRG 200)

Qualification	Undergraduate
Module credits	24.00
Programmes	BCom Accounting Sciences BSc Information and Knowledge Systems
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Economic and Management Sciences
Prerequisites	KRG 120
Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	Mercantile Law
Period of presentation	Year

Module content

Company law, law concerning close corporations, law of partnerships, labour law, law of arbitration and transport, law of insurance, law concerning negotiable documents, law of insolvency, law of succession and trusts.

Criminology 110 (KRM 110)

Qualification	Undergraduate
Module credits	12.00
Programmes	BA BA Extended programme BA Languages BA Law BIS Information Science BSW BSc Information and Knowledge Systems LLB
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Law Faculty of Theology and Religion
Prerequisites	No prerequisites.
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Social Work and Criminology
Period of presentation	Semester 1

Module content

Part 1: Fundamental criminology
A general introduction to criminology is provided. An overview of factors that contribute to crime, forensic criminology and forensic criminalistics are investigated.
Part 2: Violent crime
Various types of violent crimes receive attention in this section.

Criminology 120 (KRM 120)

Qualification	Undergraduate
Module credits	12.00
Programmes	BA BA Extended programme BA Languages BA Law BIS Information Science BSW BSc Information and Knowledge Systems LLB

Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Law Faculty of Theology and Religion
Prerequisites	KRM 110
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Social Work and Criminology
Period of presentation	Semester 2

Module content

Part 1: Penology

Attention is given to the roleplayers in the criminal justice system, namely the police, judiciary and corrections.

Part 2: Crime prevention and control

The nature and extent of crime, theories to explain criminal behaviour and crime prevention and control are investigated.

The two sections will not necessarily be presented in chronological order.

Criminology 210 (KRM 210)

Qualification	Undergraduate
Module credits	20.00
Programmes	BA BA Languages BA Law BSW BSc Information and Knowledge Systems
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Law
Prerequisites	KRM 110,120
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Social Work and Criminology
Period of presentation	Semester 1

Module content

Part 1: Forensic criminalistics

The integrated nature of systematic criminal investigation is explored by demarcating the study field into the criminal tactic and technique.

Part 2: Youth misbehaviour

The nature, extent, theoretical explanations as well as prevention and control of youth misbehaviour are investigated.

The two sections will not necessarily be presented in chronological order.

Criminology 220 (KRM 220)

Qualification Undergraduate

Module credits 20.00

Programmes [BA](#)
[BA Languages](#)
[BA Law](#)
[BSW](#)
[BSc Information and Knowledge Systems](#)

Service modules Faculty of Engineering, Built Environment and Information Technology
Faculty of Law

Prerequisites KRM 110, 120, 210 (KRM 210 is not a prerequisite for BSW students)

Contact time 2 lectures per week

Language of tuition Module is presented in English

Department Social Work and Criminology

Period of presentation Semester 2

Module content

Part 1: Victimology

Contemporary issues in victimology are explored and special attention is given to aspects such as victim-based legislation and restorative justice.

Part 2: Political offences

Political offences such as corruption, assassination and human rights violations are investigated in this section.

The two sections will not necessarily be presented in chronological order.

Construction quantities 201 (KSH 201)

Qualification Undergraduate

Module credits 24.00

Programmes [BSc Construction Management](#)

Prerequisites BWT 110, BWT 120 and HVH 101

Contact time 1 practical per week, 3 lectures per week

Language of tuition Module is presented in English

Department Construction Economics

Period of presentation Year

Module content

Measuring of simple buildings and simple building elements and external works. Abstracting and billing.

Construction quantities 300 (KSH 300)

Qualification Undergraduate

Module credits 24.00

Programmes	BSc Construction Management
Prerequisites	BWT 210, BWT 220, GBD 112, GBD 122 and KSH 201
Contact time	1 practical per week, 3 lectures per week
Language of tuition	Afrikaans and English are used in one class
Department	Construction Economics
Period of presentation	Year

Module content

Measuring of simple concrete structures, structural steelwork, plumbing and drainage, and alterations. Material lists, analysis of building costs, certificates, contract price adjustment provisions (CPAP) and final accounts.

Construction quantities 700 (KSH 700)

Qualification	Postgraduate
Module credits	20.00
Programmes	BScHons Construction Management
Prerequisites	No prerequisites.
Contact time	1 practical per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Construction Economics
Period of presentation	Year

Module content

Preliminaries and pricing thereof, different types of bills of quantities, tender documentation, economical designs, building cost estimates, analysis of building costs, calculation of professional fees. Project and Construction Management Professions Act; Council for the Built Environment Act (CBE Act); Construction Industry Development Board Act (CIDB Act). Geotechnical and civil engineering works.

Information and communications technology law 420 (KUB 420)

Qualification	Undergraduate
Module credits	10.00
Programmes	BSc Information and Knowledge Systems LLB
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	No prerequisites.
Contact time	5 practicals per week
Language of tuition	Afrikaans and English are used in one class
Department	Mercantile Law
Period of presentation	Semester 2

Module content

*For LLB

- (a) Introduction to the study of information and communications technology law:
 - The place of information and communications technology law in the legal system
 - The nature and scope of information and communications technology law
 - Sources of information and communications technology law
 - Inception and influence of the Internet
- (b) Regulation of the Internet:
 - National/International
 - Jurisdiction
- (c) Aspects of intellectual property law and the Internet
- (d) E-commerce activities and the Internet:
 - Aspects of jurisdiction and signing of contracts
 - Data protection and encryption
 - Liability of Internet service providers
- (e) Advertising and the Internet
- (f) Criminal liability in information and communications technology law
- (g) Constitutional aspects in information and communications technology law:
 - The right to privacy/freedom of expression/information

Information and communications technology law 780 (KUB 780)

Qualification	Postgraduate
Module credits	15.00
Programmes	BITHons Information Systems
Service modules	Faculty of Economic and Management Sciences
Prerequisites	KRG 110 or BER 210 or BER 310 or BER 410
Contact time	1 lecture per week
Language of tuition	Module is presented in English
Department	Mercantile Law
Period of presentation	Semester 1 or Semester 2

Module content

- a) Introduction to the study of information and communications technology law:
 - The place of information and communications technology law in the legal system
 - The nature and scope of information and communications technology law
 - Sources of information and communications technology law
 - Inception and influence of the Internet
- b) Regulation of the Internet:
 - National/International
 - Jurisdiction
- c) Aspects of intellectual property law and the Internet
- d) E-Commerce activities and the Internet:
 - Aspects of jurisdiction and signing of contracts
 - Dataprotection and encryption
 - Liability of Internet service providers
 - Consumer Protection
- e) Criminal liability in information and communications technology space
- f) Constitutional aspects in information and communications technology space:
 - The right to privacy/freedom of expression/information

Landscape architecture 212 (LAN 212)

Qualification	Undergraduate
Module credits	8.00
Programmes	BSc Landscape Architecture
Prerequisites	No prerequisites.
Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	Architecture
Period of presentation	Semester 1

Module content

Introductory Botany and plant diversity; plant design philosophy; criteria and process for plant material selection and preparing plant material lists; plant classification; identification of genera and species.

Landscape architecture 222 (LAN 222)

Qualification	Undergraduate
Module credits	8.00
Programmes	BSc Landscape Architecture
Prerequisites	LAN 212 GS
Contact time	3 lectures per week
Language of tuition	Module is presented in English

Department	Architecture
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Period of presentation	Semester 2
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Module content

The role of plant geography in plant selection and the identification of plant species specific to their natural environment; practical considerations in plant selection.

Dissertation: Landscape architecture 890 (LAN 890)

Qualification	Postgraduate
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Module credits	180.00
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Programmes	MLArch
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Prerequisites	No prerequisites.
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Language of tuition	Module is presented in English
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Department	Architecture
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Period of presentation	Year
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Thesis: Landscape architecture 990 (LAN 990)

Qualification	Postgraduate
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Module credits	360.00
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Programmes	PhD Landscape Architecture
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Prerequisites	No prerequisites.
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Language of tuition	Module is presented in English
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Department	Architecture
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Period of presentation	Year
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Language, life and study skills 133 (LST 133)

Qualification	Undergraduate
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Module credits	8.00
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Programmes	BCom Extended programme BSc Extended programme - Biological and Agricultural Sciences BSc Extended programme - Mathematical Sciences BSc Extended programme - Physical Sciences
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Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Economic and Management Sciences
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Prerequisites	Admission into BSc Four-year programme and BCom Four-year programme
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Contact time	4 discussion classes per week, Foundation Course
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Language of tuition	Module is presented in English
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Department	Unit for Academic Literacy
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Period of presentation Semester 1

Module content

In this module students use different information and time management strategies, build academic vocabulary, revise basic grammar concepts and dictionary skills, examine learning styles, memory and note-taking techniques, practise academic reading skills and explore basic research and referencing techniques, learn how to use discourse markers and construct definitions, and are introduced to paragraph writing. The work is set in the context of the students' field of study.

Language, life and study skills 143 (LST 143)

Qualification Undergraduate

Module credits 8.00

Programmes BCom Extended programme
BSc Extended programme - Biological and Agricultural Sciences
BSc Extended programme - Mathematical Sciences
BSc Extended programme - Physical Sciences

Service modules Faculty of Engineering, Built Environment and Information Technology
Faculty of Economic and Management Sciences

Prerequisites LST 133

Contact time 4 discussion classes per week, Foundation Course

Language of tuition Module is presented in English

Department Unit for Academic Literacy

Period of presentation Semester 2

Module content

In this module students learn how to interpret and use visual literacy conventions. Students write more advance paragraphs, and also learn how to structure academic writing, how to refine their use of discourse markers and referencing techniques and how to structure their own academic arguments. Students' writing is expected to be rational, clear and concise. As a final assignment all aspects of the LST 133 and LST 143 modules are combined in a research assignment. In this project, students work in writing teams to produce a chapter on a career and to present an oral presentation of aspects of the chapter. The work is set in the context of the students' field of study.

Bulk solids storage and flow 780 (MAA 780)

Qualification Postgraduate

Module credits 16.00

Prerequisites No prerequisites.

Contact time 10 lectures per week

Language of tuition Module is presented in English

Department Mechanical and Aeronautical Engineering

Period of presentation Semester 1

Bulk solids systems and design 780 (MAC 780)

Qualification	Postgraduate
Module credits	16.00
Prerequisites	No prerequisites.
Contact time	10 lectures per week
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 1

Aeroelasticity 780 (MAE 780)

Qualification	Postgraduate
Module credits	16.00
Prerequisites	No prerequisites.
Contact time	21 contact hours per semester
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 1 or Semester 2

Module content

Lagrange's equation, Rayleigh-Ritz method, Modal basis analysis, Structural Dynamics, Steady and unsteady aerodynamics, Panel methods, Static and dynamic aeroelasticity, Laplace transform, Convolution, Solution of the aeroelastic equation of motion.

Fluid-structure interaction 780 (MAH 780)

Qualification	Postgraduate
Module credits	16.00
Prerequisites	No prerequisites.
Contact time	21 contact hours per semester
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 1 or Semester 2

Module content

Design of structures subjected to fluid flow, i.e., high-rise buildings, chimney stacks, tube in heat exchangers, overhead power-line bundles, bridge piers, risers, pipe lines under sea, stays, masts, chemical-reaction towers, offshore platforms and aircraft components.

Porous flow 420 (MAN 420)

Qualification	Undergraduate
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Module credits	16.00
Programmes	BEng Mechanical Engineering BEng Mechanical Engineering ENGAGE
Prerequisites	No prerequisites.
Contact time	1 practical per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 2

Module content

Flow through porous media is relevant to applications such as internal combustion engines, thermal insulation engineering, electronics cooling, filtration, water movement in geothermal reservoirs, heat pipes, underground spreading of chemical waste, nuclear waste repository, geothermal engineering, grain storage, enhanced recovery of petroleum reservoirs and biological science. Introduction to the physical models used in the study of fluid flow and heat transfer in porous materials. Understanding of the transport mechanisms.

Porous flow 780 (MAN 780)

Qualification	Postgraduate
Module credits	16.00
Prerequisites	No prerequisites.
Contact time	21 contact hours per semester
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 1 or Semester 2

Module content

Transport through porous media has raised considerable attention in recent decades due to its relevance in a wide range of applications such as vehicle engines, thermal insulation engineering, electronics cooling, filtration, water movement in geothermal reservoirs, heat pipes, underground spreading of chemical waste, nuclear waste repository, geothermal engineering, grain storage, enhanced recovery of petroleum reservoirs and biological science. This module gives an introduction to the physical models used in the study of fluid flow and heat transfer in porous materials, and will give an understanding of the transport mechanism.

Aircraft propulsion 780 (MAY 780)

Qualification	Postgraduate
Module credits	16.00
Prerequisites	No prerequisites.
Contact time	21 contact hours per semester
Language of tuition	Module is presented in English

Department	Mechanical and Aeronautical Engineering
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Period of presentation	Semester 1 or Semester 2
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Module content

Review of thermodynamic cycles applicable to aircraft propulsion with emphasis on turbocharged piston cycles and gas turbine cycles. Optimisation of gas turbine cycles, 2D and 3D turbomachinery design and fluid mechanics and loss mechanisms in gas turbines.

Solar energy 780 (MBA 780)

Qualification	Postgraduate
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Module credits	16.00
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Prerequisites	No prerequisites.
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Contact time	21 contact hours per semester
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Language of tuition	Module is presented in English
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Department	Mechanical and Aeronautical Engineering
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Period of presentation	Semester 1 or Semester 2
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Module content

In this module the different solar-thermal systems will be introduced and analysed with the heat transfer and thermodynamics principles that apply. The main focus will include; sun-earth geometrical relations, solar radiation, energy requirements in buildings, energy storage, heating and cooling processes, bulk solar thermal power generation systems, life cycle costing and large scale plant specifics and quantification.

Control systems 410 (MBB 410)

Qualification	Undergraduate
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Module credits	16.00
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Programmes	BEng Mechanical Engineering BEng Mechanical Engineering ENGAGE
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Prerequisites	MVR 320 GS
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Contact time	2 practicals per week, 3 lectures per week
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Language of tuition	Module is presented in English
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Department	Mechanical and Aeronautical Engineering
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Period of presentation	Semester 2
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Module content

Introduction to control systems. Modelling of dynamic systems. Transfer functions. Block diagrams and block diagram algebra. Linearisation of non-linear systems. Disturbance signals. Steady-state accuracy. Control systems characteristics. Analysis of control systems using Laplace transformations. Root loci. Bode diagrams. Design of compensators using bode diagram and root locus design techniques. Introduction to sampled data control systems. The Z-transform. Implementation of controllers on a computer. Controls laboratory.

Control Systems 780 (MBB 780)

Qualification	Postgraduate
Module credits	16.00
Programmes	BEngHons Mechanical Engineering BScHons Applied Science Mechanics
Prerequisites	Working knowledge of MATLAB/OCTAVE
Contact time	21 contact hours per semester
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 1

Module content

Introduction to state space methods, full state feedback design, disturbances and tracking systems, linear observers, compensator design by the separation principle, linear quadratic optimum control, Kalman filter, linear quadratic Gaussian compensator.

Topology and shape optimisation 780 (MBT 780)

Qualification	Postgraduate
Module credits	16.00
Prerequisites	No prerequisites.
Contact time	21 contact hours per semester
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 1 or Semester 2

Module content

The topology optimisation method solves the basic engineering problem of distributing a limited amount of material in a design space. Material distribution methods, based on the use of mathematical programming and Numerical Schemes are used to determine the optimum architecture of a system and is used to identify possible shape and lay-outs of material. Applications of this optimisation method include optimisation of structural members, but can also be extended to flow and heat transfer optimisation.

Computational fluid dynamics 732 (MBV 732)

Qualification	Postgraduate
Module credits	32.00
Prerequisites	No prerequisites.
Contact time	10 lectures per week
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering

Period of presentation Semester 1

Introduction to microbiology 161 (MBY 161)

Qualification Undergraduate

Module credits 8.00

Programmes

BSc Biochemistry
BSc Biological Sciences
BSc Biotechnology
BSc Chemistry
BSc Computer Science
BSc Culinary Science
BSc Ecology
BSc Entomology
BSc Extended programme - Biological and Agricultural Sciences
BSc Food Science
BSc Genetics
BSc Human Genetics
BSc Human Physiology
BSc Information and Knowledge Systems
BSc Medical Sciences
BSc Microbiology
BSc Nutrition
BSc Plant Science
BSc Zoology
BScAgric Animal Science
BScAgric Applied Plant and Soil Sciences
BScAgric Plant Pathology

Service modules Faculty of Engineering, Built Environment and Information Technology

Prerequisites No prerequisites.

Contact time 2 lectures per week, fortnightly tutorials

Language of tuition Module is presented in English

Department Biochemistry, Genetics and Microbiology

Period of presentation Semester 2

Module content

The module will introduce the student to the field of Microbiology. Basic Microbiological aspects that will be covered include introduction into the diversity of the microbial world (bacteria, archaea, eukaryotic microorganisms and viruses), basic principles of cell structure and function, microbial nutrition and microbial growth and growth control. Applications in Microbiology will be illustrated by specific examples i.e. bioremediation, animal-microbial symbiosis, plant-microbial symbiosis and the use of microorganisms in industrial microbiology. Wastewater treatment, microbial diseases and food will be introduced using specific examples.

Bacteriology 251 (MBY 251)

Qualification Undergraduate

Module credits	12.00
Programmes	BSc Biochemistry BSc Biotechnology BSc Chemistry BSc Culinary Science BSc Ecology BSc Entomology BSc Food Science BSc Genetics BSc Human Genetics BSc Human Physiology BSc Information and Knowledge Systems BSc Medical Sciences BSc Microbiology BSc Plant Science BSc Zoology BScAgric Plant Pathology
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	MBY 161 GS
Contact time	2 lectures per week, fortnightly practicals
Language of tuition	Module is presented in English
Department	Biochemistry, Genetics and Microbiology
Period of presentation	Semester 1

Module content

Growth, replication and survival of bacteria, Energy sources, harvesting from light versus oxidation, regulation of catabolic pathways, chemotaxis. Nitrogen metabolism, iron-scavenging. Alternative electron acceptors: denitrification, sulphate reduction, methanogenesis. Bacterial evolution, systematic and genomics. Biodiversity; bacteria occurring in the natural environment (soil, water and air), associated with humans, animals, plants, and those of importance in foods and in the water industry.

Mycology 261 (MBY 261)

Qualification Undergraduate

Module credits 12.00

Programmes	BSc Biochemistry
	BSc Biotechnology
	BSc Chemistry
	BSc Ecology
	BSc Entomology
	BSc Food Science
	BSc Genetics
	BSc Human Genetics
	BSc Human Physiology
	BSc Information and Knowledge Systems
	BSc Medical Sciences
	BSc Microbiology
	BSc Plant Science
	BSc Zoology
	BScAgric Plant Pathology

Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	MBY 161 GS
Contact time	2 lectures per week, Fortnightly practicals/tutorials
Language of tuition	Module is presented in English
Department	Biochemistry, Genetics and Microbiology
Period of presentation	Semester 2

Module content

Organisation and molecular architecture of fungal thalli, chemistry of the fungal cell. Chemical and physiological requirements for growth and nutrient acquisition. Mating and meiosis; spore development; spore dormancy, dispersal and germination. Fungi as saprobes in soil, air, plant, aquatic and marine ecosystems; role of fungi as decomposers and in the deterioration of materials; fungi as predators and parasites; mycoses, mycetisms and mycotoxicoses; fungi as symbionts of plants, insects and animals. Applications of fungi in biotechnology.

Composite materials 780 (MCM 780)

Qualification	Postgraduate
Module credits	16.00
Prerequisites	No prerequisites.
Contact time	21 contact hours per semester
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 1

Module content

Fundamental concepts of composite materials; manufacturing methods; design criteria of laminated composite materials; determining mechanical properties of composite materials: anisotropic elasticity and laminate theory, beams and columns of composite materials, plates and panels, transverse shear deformation effects, twisting and stretching shear coupling, composite shells; hygrothermal effects; strength and failure theories.

Music technology 200 (MCS 200)

Qualification	Undergraduate
Module credits	12.00
Programmes	BMus BMus Extended programme BSc Information and Knowledge Systems
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	Admission into relevant programme.
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	School of the Arts
Period of presentation	Year

Module content

*Closed – requires departmental selection.

This module is the start of a series of modules that form part of an elective programme aiming to prepare, equip and train the student with music-technology related skills and specialisations. It is designed to provide a thorough introductory audio-related engineering and programming skillset for the candidate. The student enrolled in the elective programme does so with the intention to be trained as an expert in the music-technology field and related disciplines.

Music technology 302 (MCS 302)

Qualification	Undergraduate
Module credits	18.00
Programmes	BMus BMus Extended programme BSc Information and Knowledge Systems
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	Admission into relevant programme MCS 200
Contact time	2 lectures per week
Language of tuition	Afrikaans and English are used in one class
Department	School of the Arts
Period of presentation	Year

Module content

*Closed – requires departmental selection.

This module is the second in a series of modules that form part of an elective programme aiming to prepare, equip and train the student with music-technology related skills and specialisations. It is designed to provide a thorough, post-introductory audio-related engineering and programming skillset for the candidate. The student enrolled in the elective programme does so with the intention to be trained as an expert in the music-technology field and related disciplines.

Music technology 402 (MCS 402)

Qualification	Undergraduate
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Module credits	40.00
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Programmes	BMus BMus Extended programme BSc Information and Knowledge Systems
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Service modules	Faculty of Engineering, Built Environment and Information Technology
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Prerequisites	Admission into relevant programme
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Contact time	2 lectures per week
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Language of tuition	Module is presented in English
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Department	School of the Arts
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Period of presentation	Year
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Module content

*Closed – requires departmental selection.

Aspects of music technology: This module is the third and final in a series of modules that form part of an elective programme aiming to prepare, equip and train the student with music-technology related skills and specialisations. It is designed to provide an advanced and thorough, audio-related engineering and programming skillset for the candidate. The student enrolled in the elective programme does so with the intention to be trained as an expert in the music-technology field and related disciplines.

Non-destructive testing 780 (MCT 780)

Qualification	Postgraduate
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Module credits	16.00
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Programmes	BEngHons Mechanical Engineering BScHons Applied Science Mechanics BScHons Applied Science Mechanics: Physical Asset Management
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Contact time	21 contact hours per semester
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Language of tuition	Module is presented in English
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Department	Mechanical and Aeronautical Engineering
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Period of presentation	Semester 1 or Semester 2
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Module content

Probability, design and management in non-destructive testing (NDT). Fundamental theory of commonly used NDT methods: Ultrasonic testing, Electromagnetic testing (MT and ACFM). Radiographic testing, Penetrant testing, Eddy current testing. Other NDT technologies, including phased array UT, time-of flight diffraction. Digital (RT and Acoustic emission. Monitoring.

Finite element methods 780 (MEE 780)

Qualification	Postgraduate
Module credits	16.00
Prerequisites	A working knowledge of MATLAB/OCTAVE or FORTRAN77
Contact time	21 contact hours per semester
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 1

Module content

Stress and the differential equilibrium equation. Isoparametric formulation. Numerical integration. Reduced integration. Convergence, stability and accuracy. The Patch test. Membrane elements: assumed stress mixed interpolations. 3-D elements. Error estimates and mesh refinement. Sensitivity analysis.

Advanced finite element methods 781 (MEE 781)

Qualification	Postgraduate
Module credits	16.00
Programmes	BEngHons Mechanical Engineering BScHons Applied Science Mechanics
Prerequisites	No prerequisites.
Contact time	21 contact hours per semester
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 1 or Semester 2

Module content

Non-linear statics: Overview of non-linear effects: geometric, material and boundary conditions. Continuum mechanics: tensors, indicial notation, deformation gradients, stress and strain measures, transformations and rotations, stress-strain relationships, constitutive models. Principles of virtual work. Solution methods: direct iteration, Newton methods, incremental/iterative procedures. Lagrange engineering strains. Large displacement finite element analysis of continua: total Lagrangian formulation. Small strain plasticity: Additive decomposition, flow rule, hardening laws, continuum and consistent tangents.

Mechatronics 421 (MEG 421)

Qualification	Undergraduate
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Module credits	16.00
Programmes	BEng Mechanical Engineering BEng Mechanical Engineering ENGAGE
Prerequisites	No prerequisites.
Contact time	1 practical per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 2

Module content

Power supplies: How various voltage levels are obtained from a single source. Sensors and Actuators: Basics behind the most common actuators and sensors. Analogue: The use of MOSFETS, transistors, op-amps, diodes. Digital: Basic understanding of digital communication. Sampling theory: The effect of aliasing and the design of anti-aliasing filters. Programming: Program a PIC microcontroller using C. Control: Implementation of PID and fuzzy logic control in discrete time systems.

Mechatronics 780 (MEG 780)

Qualification	Postgraduate
Module credits	16.00
Programmes	BEngHons Mechanical Engineering BScHons Applied Science Mechanics
Prerequisites	No prerequisites.
Contact time	13 lectures per week
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 2

Module content

Sensors: mechanical and optical limit switches, encoders, thermocouples, strain gauges, CCD cameras, IR sensors, piezo-electric sensors, capacitive sensors, torque sensors, tactile sensors, gyroscope and ultrasonic sensors. Actuators: DC motors, stepper motors, AC motors, pneumatic actuators, hydraulic actuators, memory shape alloys. Signal conditioning: component interconnection, amplifiers, analogue filters, modulators and demodulators, analogue-digital conversion, sample-and-hold circuitry, multiplexers, software and hardware implementation of digital filters and Wheatstone bridge. Control: H-Bridge motor control, PWM motor control, control of stepper motors, non-linear control of hydraulic and pneumatic actuators, PLCs, SCADA systems, industrial Fieldbus, micro-processor control.

Vibration-based condition monitoring 781 (MEV 781)

Qualification	Postgraduate
Module credits	16.00

Programmes	BEngHons Mechanical Engineering BScHons Applied Science Mechanics BScHons Applied Science Mechanics: Physical Asset Management
Prerequisites	Working knowledge of MATLAB/OCTAVE
Contact time	21 contact hours per semester
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 1

Module content

Vibration measurement: conventional and optical technique, digital signal processing in vibrations, vibration monitoring: diagnostics and prognostics, artificial intelligence in vibration monitoring, human vibration.

Graphical communication 110 (MGC 110)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Chemical Engineering BEng Chemical Engineering ENGAGE BEng Civil Engineering BEng Civil Engineering ENGAGE BEng Electrical Engineering BEng Electrical Engineering ENGAGE BEng Electronic Engineering BEng Electronic Engineering ENGAGE BEng Industrial Engineering BEng Industrial Engineering ENGAGE BEng Mechanical Engineering BEng Mechanical Engineering ENGAGE BEng Metallurgical Engineering BEng Metallurgical Engineering ENGAGE BEng Mining Engineering BEng Mining Engineering ENGAGE
Prerequisites	No prerequisites.
Contact time	3 lectures per week, 3 tutorials per week
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 1

Module content

Freehand sketching covering the following: perspective, isometric and orthographic drawings. Drawing conventions, graphical techniques and assembly drawings. Evaluation of drawings and error detection. True lengths of lines, projections and intersections. Practical applications of these techniques. Introduction to computer-aided drawings, including dimensioning, crosshatching and detailing. Introduction to basic manufacturing processes including primary (casting, forging and extrusion) and secondary (drilling, turning, milling, grinding, broaching and sawing) manufacturing procedures.

Musicology 100 (MGS 100)

Qualification	Undergraduate
Module credits	20.00
Programmes	BSc Information and Knowledge Systems
Prerequisites	No prerequisites.
Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	School of the Arts
Period of presentation	Year

Module content

*Closed – requires departmental selection

*Requires knowledge of music notation.

Baroque, Classical and Introduction to Jazz: A historical musicological approach to the development and contexts of Western art music during the Baroque and Classical era, and an introduction to the history of jazz, through in-depth critical listening and reading of representative major composers, musical genres, styles and forms.

Heat and mass transfer 420 (MHM 420)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Mechanical Engineering BEng Mechanical Engineering ENGAGE
Prerequisites	No prerequisites.
Contact time	1 practical per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 2

Module content

Fundamentals of Thermal Radiation; blackbody radiation, radiative properties, Kirchhoff's law. Radiation Heat Transfer; the view factor, gray surfaces, radiation shields. Boiling and condensation; pool and film boiling, film condensation, dropwise condensation. Heat exchangers; types, analysis, design, and selection. Mass transfer: Fick's Law, mass diffusion, mass convection, simultaneous heat and mass transfer, porous catalysts.

Advanced heat and mass transfer 780 (MHM 780)

Qualification	Postgraduate
Module credits	16.00
Programmes	BEngHons Mechanical Engineering BScHons Applied Science Mechanics
Prerequisites	No prerequisites.
Contact time	21 contact hours per semester
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 1 or Semester 2

Module content

Convection correlations: high speed flows, boundary layers, similarity, conservation equations, scale analysis. Thermal radiation: physics, exchange between surfaces, solar, directional characteristics, spectral characteristics, radiation through gasses. Convection, evaporation and boiling: film condensation, film evaporation, pool boiling, forced-convection boiling and condensation, flow regime maps, phase change at low pressures, heatpipes. Heat exchangers: types, regenerators, heat exchanger design. Mass transfer: Fick's Law, mass diffusion, mass convection, simultaneous heat and mass transfer, porous catalysts. High mass transfer rate theory. Mass exchangers.

Engineering activity and group work 320 (MIA 320)

Qualification	Undergraduate
Module credits	8.00

Programmes

BEng Chemical Engineering
BEng Chemical Engineering ENGAGE
BEng Computer Engineering
BEng Computer Engineering ENGAGE
BEng Electrical Engineering
BEng Electrical Engineering ENGAGE
BEng Electronic Engineering
BEng Electronic Engineering ENGAGE
BEng Industrial Engineering
BEng Industrial Engineering ENGAGE
BEng Mechanical Engineering
BEng Mechanical Engineering ENGAGE
BEng Metallurgical Engineering
BEng Metallurgical Engineering ENGAGE
BEng Mining Engineering
BEng Mining Engineering ENGAGE

Prerequisites	(BSS 310), (CJJ 310) or (EJJ 210) or (BJJ 210) or (MJJ 210) or (NJJ 210) or (PJJ 210)
Contact time	1 other contact session per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 2

Module content

Two exit learning outcomes (ELO) of ECSA are addressed and each must be passed in the same semester. ELO7: Demonstrate critical awareness of the impact of engineering activity on the social, industrial and physical environment. The history of engineering globally and in South Africa. Most important engineering projects globally and in South Africa. The impact of technology on society. Occupational and public health and safety. Occupational Health and Safety Act. Impacts on the physical environment. The personal, social, cultural values and requirements of those affected by engineering activity. The combination of social, workplace (industrial) and physical environmental factors are appropriate to the discipline of the qualification. ELO8: Demonstrate competence to work effectively on a small project as an individual, in teams and in multidisciplinary environments. Identifies and focuses on objectives. Works strategically. Executes tasks effectively. Delivers completed work on time. Effective team work: Makes individual contribution to team activity; performs critical functions; enhances work of fellow team members; benefits from support of team members; communicates effectively with team members; delivers completed work on time. Multidisciplinary work by the following: Acquires a working knowledge of co-workers' discipline; uses a systems engineering approach; communicates across disciplinary boundaries. Report and presentation on team project. Tasks require co-operation across at least one disciplinary boundary. Students acquire a working knowledge of co-workers discipline. Students communicate between disciplinary boundaries.

Condition-based maintenance 780 (MIC 780)

Qualification	Postgraduate
Module credits	16.00

Programmes	BEngHons Mechanical Engineering BScHons Applied Science Mechanics BScHons Applied Science Mechanics: Physical Asset Management
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Prerequisites	No prerequisites.
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Contact time	21 contact hours per semester
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Language of tuition	Module is presented in English
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Department	Mechanical and Aeronautical Engineering
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Period of presentation	Semester 1 or Semester 2
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Module content

Theory and practical applications of condition based maintenance techniques. Pitfalls of the various condition based maintenance techniques. Acoustic emission, wear debris monitoring, oil analysis, thermography and non-destructive testing.

Condition-based maintenance 781 (MIC 781)

Qualification	Postgraduate
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Module credits	32.00
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Prerequisites	No prerequisites.
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Contact time	10 lectures per week
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Language of tuition	Module is presented in English
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Department	Mechanical and Aeronautical Engineering
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Period of presentation	Semester 2
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Conditioned-based maintenance 832 (MIC 832)

Qualification	Postgraduate
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Module credits	32.00
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Prerequisites	No prerequisites.
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Contact time	10 lectures per week
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Language of tuition	Module is presented in English
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Department	Mechanical and Aeronautical Engineering
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Period of presentation	Semester 2
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Maintenance engineering 420 (MII 420)

Qualification	Undergraduate
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Module credits	16.00
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Programmes	BEng Mechanical Engineering BEng Mechanical Engineering ENGAGE
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Prerequisites	No prerequisites.
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Contact time	1 practical per week, 3 lectures per week
Language of tuition	Separate classes for Afrikaans and English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 2

Module content

Introduction: Definition and objectives, statistical concepts. Mathematics of failure: Reliability concepts, fitting distribution to failure data. Maintenance management: Investment decisions, maintenance profit impact. Maintenance structure: Preventive, time based, condition based, corrective, design out. Data analysis: Renewable, repairable systems, Laplace trend test, analysis methodology. Optimizing maintenance strategies: Replacement/overhaul age, inspection frequencies, capital replacement, simulation. Reliability-Centred Maintenance (RCM). Maintenance systems: Components, structure, computer methods. Tribology: Friction laws, lubrication theory, contamination control. Maintenance Practice: Systems approach, management approach, modelling.

Reliability-based maintenance 781 (MII 781)

Qualification	Postgraduate
Module credits	16.00
Prerequisites	MIR 781 Reliability engineering 781
Contact time	21 contact hours per semester
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 1 or Semester 2

Module content

Component reliability: Weibull analysis, Limitations of Weibull analysis – when not to use it. System reliability and availability: reliability/availability modelling, the availability block diagram (ABD), Cut sets, capacity constraints, m-out-of-n systems and storage capacity, Fault trees, Failure modes, Effects and criticality analysis (FMECA). Failure and repair rate data: Reliability engineering's red herring: "We don't have the data", Some data banks that are in fact useful, Data synthesis: the method of paired comparisons, Paper on The use of NERC-GADS data in determining standards for system design, Case study in and exercise in data synthesis.

Dissertation: Metallurgical engineering 890 (MIN 890)

Qualification	Postgraduate
Module credits	180.00
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Materials Science and Metallurgical Engineering
Period of presentation	Year

Thesis: Metallurgical engineering 990 (MIN 990)

Qualification	Postgraduate
Module credits	360.00
Programmes	PhD Metallurgical Engineering
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Materials Science and Metallurgical Engineering
Period of presentation	Year

Maintenance practice 780 (MIP 780)

Qualification	Postgraduate
Module credits	16.00
Programmes	BEngHons Mechanical Engineering BScHons Applied Science Mechanics BScHons Applied Science Mechanics: Physical Asset Management
Prerequisites	No prerequisites.
Contact time	21 contact hours per semester
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 1

Module content

Failure characteristics and analysis. Maintenance economics – Budgeting and cost control. Life cycle partnering and maintenance contracting. Legal aspects and case study. Performance measurement and benchmarking. Maintenance programming – Network analysis. Variability analysis. Maintenance strategy, plan, and protocol design – a new look at RCM. Maintenance tactic selection techniques. Introduction to condition-based maintenance. Tribology and contamination control presented with case studies. Maintenance Maturity Indexing and Variable Relationships development.

Maintenance practice 781 (MIP 781)

Qualification	Postgraduate
Module credits	16.00
Prerequisites	MIP 780 Maintenance practice 780 (recommended)
Contact time	21 contact hours per semester
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 2

Module content

Maintenance process modelling and configuration management. Maintenance audit systems. Systems thinking and complexity analysis as applied to the maintenance environment. Risk analysis. "Fit" analysis. Management information systems. CMMS and implementation. Maintenance Finance and Cost types. Project selection techniques. Employee competence analysis and motivation of maintenance workers. Work priority modelling.

Maintenance logistics 782 (MIP 782)

Qualification	Postgraduate
Module credits	16.00
Programmes	BEngHons Mechanical Engineering BScHons Applied Science Mechanics BScHons Applied Science Mechanics: Physical Asset Management
Prerequisites	No prerequisites.
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 1 or Semester 2

Module content

Introduction to Logistics, RAM (Reliability, Maintainability, and Availability), Measures of Logistics, Inventory Systems,
Systems Engineering and Supportability Analysis: Systems Engineering Process, Supportability Analysis, Aspects of Logistical Design: Logistics in the Design and Development Phase, Just-in-Time Systems, Facility Layout, Job Design and Work Measurement,
Logistics from the Development to the Retirement Phase: Logistics in the Production/Construction Phase, Logistics in the Utilisation and Support Phase,
Planning and Scheduling: Forecasting, Planning, Maintenance Scheduling, Project Management, Theory of Constraints,
Logistics Management: Quality Management, Supply Chain Management, Logistics Management.

Maintenance operations 783 (MIP 783)

Qualification	Postgraduate
Module credits	16.00
Prerequisites	No prerequisites.
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 2

Module content

Understanding the Maintenance Function: Maintenance Models, Maintenance Profit Impact, Maintenance Reliability Centredness, Strategic Fundamentals,
Building a Business Case for Maintenance, Maintenance Management Systems: Philosophies, System Structure, Database Structure, Maintenance Administration, Work/Cost/Materials Control,
Maintenance Cost Management: Maintenance Cost Strategies, Maintenance Budgeting, Maintenance Cost Analysis,
Total Productive Maintenance: History, Benefits, Structure, Implementation,
Strategic Thinking in Maintenance: Principles, The role of a Maintenance Policy, Measurement,
Quality in Maintenance: Quality Principles, Total Quality Management, Maintenance Application,
Maintenance Risk: Risk Calculation, Macro Risk Management, Micro Risk Management,
World Class Maintenance: Definitions, Methods to achieve WCM.

Reliability engineering 781 (MIR 781)

Qualification	Postgraduate
Module credits	16.00
Programmes	BEngHons Mechanical Engineering BScHons Applied Science Mechanics BScHons Applied Science Mechanics: Physical Asset Management
Prerequisites	No prerequisites.
Contact time	21 contact hours per semester
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 1

Module content

Introduction to probabilistic distributions, computation of system reliability, building reliability models and optimisation of system reliability; Fault Tree Analysis; Failure Modes, Effects and Criticality Analysis (FMECA), Monte Carlo Simulation; probability-based design.

Reliability engineering 832 (MIR 832)

Qualification	Postgraduate
Module credits	32.00
Prerequisites	No prerequisites.
Contact time	10 lectures per week
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 1

Dissertation: Mechanical engineering 890 (MIR 890)

Qualification	Postgraduate
Module credits	180.00
Programmes	MEng Mechanical Engineering
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Year

Dissertation 891 (MIR 891)

Qualification	Postgraduate
Module credits	180.00
Programmes	MSc Applied Science Mechanics
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Year

Thesis: Mechanical engineering 990 (MIR 990)

Qualification	Postgraduate
Module credits	360.00
Programmes	PhD Mechanical Engineering
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Year

Thesis: Mechanics 998 (MIR 998)

Qualification	Postgraduate
Module credits	360.00
Programmes	PhD Mechanics
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Year

Tribology 780 (MIT 780)

Qualification	Postgraduate
Module credits	16.00
Prerequisites	No prerequisites.
Contact time	10 lectures per week
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 2

Module content

Friction – Theory and laws of friction, friction behaviour of different materials. Lubrication and theory, hydrodynamic lubrication, elastohydrodynamic lubrication, boundary lubrication. Lubricants – wear – wear theory, wear mechanisms, particle properties. Surface modification and coverings, filtration, choice of filtration limits. Design and wear – determining wear rates, role of operational parameters, choice, role and effect of material choice, lubrication techniques. Tribological aspects of: bearing design, gear design, design of sliding elements.

Introduction to big data science 800 (MIT 800)

Qualification	Postgraduate
Module credits	5.00
Programmes	MIT Big Data Science (Coursework)
Contact time	2 day workshop
Language of tuition	Module is presented in English
Department	School of Information Technology
Period of presentation	Quarter 1

Module content

This is the first and introductory module for the MIT degree in Big Data Science. Big Data and Data Science will be defined and students will be exposed to different application domains within the participating academic departments in the MIT degree. These departments include: Computer Science, Electrical, Electronic and Computer Engineering (EECE), Informatics, Information Science, Mathematics and Applied Mathematics, Statistics, and Health Science departments. The presentation of this module will be in the format of a two-day workshop.

Introduction to machine and statistical learning 801 (MIT 801)

Qualification	Postgraduate
Module credits	15.00
Programmes	MIT Big Data Science (Coursework)

Prerequisites	First year level higher education modules in Computer Science, Mathematics and Statistics.
Contact time	16 contact hours per semester
Language of tuition	Module is presented in English
Department	School of Information Technology
Period of presentation	Semester 1

Module content

In this module students will be exposed to different categories of machine and statistical learning algorithms that can be used to manipulate big data, identify trends from the data, modelling trends for prediction purposes as well as modelling for the detection of hidden knowledge. Students will be exposed to various machine and statistical learning algorithms/methods and they will learn how to make the right choice with regard to these. Learning, in a supervised and unsupervised mode will be covered. Furthermore students will develop a practical understanding of methods that can aid the learning process, such as, new developments in regression and classification, probabilistic graphical models, numerical Bayesian and Monte Carlo methods, neural networks, decision trees, deep learning and other computational methods. This module also includes a visualisation component focusing on the encoding of information, such as patterns, into visual objects.

Introduction to data platforms and sources 802 (MIT 802)

Qualification	Postgraduate
Module credits	5.00
Programmes	MIT Big Data Science (Coursework)
Prerequisites	First year level higher education modules in Computer Science and Statistics.
Contact time	5 contact hours
Language of tuition	Module is presented in English
Department	School of Information Technology
Period of presentation	Quarter 2

Module content

Students will obtain hands-on experience on the following technologies such as: Python, Spark, Hadoop, R and SAS, Streaming, Data fusion, Distributed file systems; and Data sources such as social media and sensor data.

Introduction to Information Ethics for Big Data Science 803 (MIT 803)

Qualification	Postgraduate
Module credits	5.00
Programmes	MIT Big Data Science (Coursework)
Contact time	5 contact hours
Language of tuition	Module is presented in English
Department	School of Information Technology

Period of presentation Quarter 1

Module content

The focus in this module is on Information Ethics and its place within the disciplines of Ethics and Philosophy. The following topics will be covered: Information Ethics and PAPAS (privacy, accuracy, property, access, security); Information ethics and the life cycle of big data; Information ethical dilemmas within big data in different disciplines, e.g. science, technology, engineering and mathematics (STEM), health sciences, economics and management sciences, social sciences and the humanities; and Case studies.

Introduction to mathematical optimization for big data science 804 (MIT 804)

Qualification Postgraduate

Module credits 5.00

Programmes [MIT Big Data Science \(Coursework\)](#)

Prerequisites First year level higher education modules in Computer Science, Mathematics and Statistics.

Contact time 5 contact hours

Language of tuition Module is presented in English

Department School of Information Technology

Period of presentation Quarter 2

Module content

In this module students will be introduced to Mathematical Optimization through gaining knowledge about the theory and algorithms to solve optimisation problems. Topics will include: Linear programming, unconstrained optimization, equality constrained optimization, general linearly and nonlinearly constrained optimization, quadratic programming, global optimization, Theory and algorithms to solve these problems.

Big data 805 (MIT 805)

Qualification Postgraduate

Module credits 10.00

Programmes [MIT Big Data Science \(Coursework\)](#)

Prerequisites First year level higher education modules in Computer Science.

Contact time 10 contact hours

Language of tuition Module is presented in English

Department School of Information Technology

Period of presentation Semester 2

Module content

This module focuses on tools for Big Data processing. The focus is on the 3 V- characteristics of Big Data namely volume, velocity and variety. Students will learn about the different architectures available for Big Data processing. The map-reduce algorithm will be studied in detail as well as graphical models for Big Data. The module will include a significant component of practical work (hands-on) where students will be exposed to real use cases that are or can be implemented on Big Data platforms.

Big data management 806 (MIT 806)

Qualification	Postgraduate
Module credits	10.00
Programmes	MIT Big Data Science (Coursework)
Prerequisites	First year level higher education modules in Computer Science.
Contact time	6 contact hours
Language of tuition	Module is presented in English
Department	School of Information Technology
Period of presentation	Quarter 4

Module content

Big data management is the governance, administration and organization of large volumes of both structured and unstructured data. Aspects included in big data management are: big data as organizational asset, harnessing big data as disruptive technology for competitive advantage, big data quality and accessibility; management strategies for large and fast-growing internal and external data, big data infrastructure and platform management, and big data policy, strategy and compliance.

Mini dissertation in big data science 807 (MIT 807)

Qualification	Postgraduate
Module credits	90.00
Programmes	MIT Big Data Science (Coursework)
Prerequisites	All the core modules must be passed
Language of tuition	Module is presented in English
Department	School of Information Technology
Period of presentation	Year

Module content

Students may choose a supervisor/co-supervisor from any of the participating departments, which includes, but are not limited to: Electrical, Electronic & Computer Engineering (EECE), Computer Science, Informatics, Information Science, Mathematics and Applied Mathematics, Statistics and Faculty of Health Science departments (Computational biology, Family Medicine, Radiology).

Big data science project 808 (MIT 808)

Qualification	Postgraduate
Module credits	20.00
Programmes	MIT Big Data Science (Coursework)
Prerequisites	All the core modules must be passed
Contact time	8 contact hours per semester
Language of tuition	Module is presented in English
Department	School of Information Technology
Period of presentation	Semester 1

Module content

This module provides the opportunity to students for demonstrating the application of the theoretical Big Data Science knowledge gained in the core part of this degree. Students are expected to identify and work with a collaborator who is taking ownership for the project. This collaborator can either be an industry partner or a researcher within one of the participating departments. Projects will be based on the entire big data lifecycle as discussed in this degree programme. This includes the gathering of data of a significant size as well as a final technical report describing the process followed and the deliverables. Depending on the complexity of the project, students can apply to work in groups with a maximum of two members. The proposed project will be subject to approval by the Department Computer Science.

Research methods for big data science 809 (MIT 809)

Qualification	Postgraduate
Module credits	5.00
Programmes	MIT Big Data Science (Coursework)
Contact time	6 contact hours
Language of tuition	Module is presented in English
Department	School of Information Technology
Period of presentation	Semester 2

Module content

Similar to MIT 862; which has the following description: Research methodologies applicable to the IT field as preparation for the mini-dissertation for the A Stream students.

Information and knowledge management 835 (MIT 835)

Qualification	Postgraduate
Module credits	8.00
Prerequisites	No prerequisites.
Contact time	16 contact hours per semester
Language of tuition	Module is presented in English
Department	Information Science

Period of presentation Semester 1

Mini-dissertation 838 (MIT 838)

Qualification Postgraduate

Module credits 90.00

Prerequisites MIT 862 (for A Stream students)

Language of tuition Module is presented in English

Department School of Information Technology

Period of presentation Year

Module content

The mini-dissertation is an individual report of independent research under the guidance of a supervisor for the A Stream students.

Please note: Only for Department of Information Science students.

Mini-dissertation 839 (MIT 839)

Qualification Postgraduate

Module credits 90.00

Prerequisites MIT 862 (for the A Stream students)

Language of tuition Module is presented in English

Department School of Information Technology

Period of presentation Year

Module content

The mini-dissertation is an individual report of independent research under the guidance of a supervisor for the A Stream students.

Please note: only for Department of Computer Science students.

Mini-dissertation 840 (MIT 840)

Qualification Postgraduate

Module credits 90.00

Programmes [MIT ICT Management \(Coursework\)](#)

Prerequisites MIT 862 (for the A Stream students)

Language of tuition Module is presented in English

Department Informatics

Period of presentation Year

Module content

The mini-dissertation is an individual report of independent research under the guidance of a supervisor for the A Stream students.

Please note: All A Stream students first register for MIT 840. As soon as a supervisor has been assigned the student will be moved to the assigned module of the corresponding department. Informatics students will remain registered for MIT 840.

Organisational behaviour and management 841 (MIT 841)

Qualification	Postgraduate
Module credits	8.00
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Semester 2

Computer science in perspective 842 (MIT 842)

Qualification	Postgraduate
Module credits	5.00
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Computer Science
Period of presentation	Semester 1

Information in perspective 843 (MIT 843)

Qualification	Postgraduate
Module credits	5.00
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Semester 1

Strategic ICT management 844 (MIT 844)

Qualification	Postgraduate
Module credits	8.00
Prerequisites	No prerequisites.
Contact time	16 contact hours per semester

Language of tuition	Module is presented in English
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Department	Informatics
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Period of presentation	Semester 1
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Digital economy 845 (MIT 845)

Qualification	Postgraduate
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Module credits	15.00
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Programmes	MIT ICT Management (Coursework)
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Prerequisites	No prerequisites.
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Contact time	10 contact hours
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Language of tuition	Module is presented in English
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Department	Informatics
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Period of presentation	Semester 2
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Information and knowledge management 846 (MIT 846)

Qualification	Postgraduate
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Module credits	15.00
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Programmes	MIT ICT Management (Coursework)
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Prerequisites	No prerequisites.
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Contact time	10 contact hours
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Language of tuition	Module is presented in English
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Department	Information Science
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Period of presentation	Semester 1
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ICT management 847 (MIT 847)

Qualification	Postgraduate
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Module credits	15.00
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Programmes	MIT ICT Management (Coursework)
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Prerequisites	No prerequisites.
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Contact time	10 contact hours
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Language of tuition	Module is presented in English
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Department	Informatics
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Period of presentation	Semester 1
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Strategic ICT management and governance 848 (MIT 848)

Qualification	Postgraduate
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Module credits	15.00
Programmes	MIT ICT Management (Coursework)
Prerequisites	No prerequisites.
Contact time	10 contact hours
Language of tuition	Module is presented in English
Department	Informatics
Period of presentation	Semester 2

Life-cycle and maturity models for IT 849 (MIT 849)

Qualification	Postgraduate
Module credits	10.00
Programmes	MIT ICT Management (Coursework)
Prerequisites	No prerequisites.
Contact time	8 contact hours per semester
Language of tuition	Module is presented in English
Department	Informatics
Period of presentation	Semester 1

Life-cycle and maturity models for IT 850 (MIT 850)

Qualification	Postgraduate
Module credits	8.00
Prerequisites	No prerequisites.
Contact time	16 contact hours per semester
Language of tuition	Module is presented in English
Department	Computer Science
Period of presentation	Semester 2

Digital economy 851 (MIT 851)

Qualification	Postgraduate
Module credits	8.00
Prerequisites	No prerequisites.
Contact time	16 contact hours per semester
Language of tuition	Module is presented in English
Department	Informatics
Period of presentation	Semester 2

ICT project management 852 (MIT 852)

Qualification	Postgraduate
Module credits	8.00
Prerequisites	No prerequisites.
Contact time	16 contact hours per semester
Language of tuition	Module is presented in English
Department	Informatics
Period of presentation	Semester 2

Corporate IT systems 853 (MIT 853)

Qualification	Postgraduate
Module credits	8.00
Prerequisites	No prerequisites.
Contact time	16 contact hours per semester
Language of tuition	Module is presented in English
Department	Computer Science
Period of presentation	Semester 2

Enterprise systems 854 (MIT 854)

Qualification	Postgraduate
Module credits	10.00
Programmes	MIT ICT Management (Coursework)
Prerequisites	No prerequisites.
Contact time	8 contact hours per semester
Language of tuition	Module is presented in English
Department	Informatics
Period of presentation	Semester 2

IT research 855 (MIT 855)

Qualification	Postgraduate
Module credits	10.00
Programmes	MIT ICT Management (Coursework)
Prerequisites	This module is a compulsory requirement for admission of A Stream students to MIT 840.
Contact time	8 contact hours per semester
Language of tuition	Module is presented in English

Department	Informatics
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Period of presentation	Semester 1
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Module content

Research methodologies applicable to the IT field as preparation for the mini-dissertation for the A Stream students.

ICT infrastructure management 860 (MIT 860)

Qualification	Postgraduate
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Module credits	8.00
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Prerequisites	No prerequisites.
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Language of tuition	Module is presented in English
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Department	Computer Science
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Period of presentation	Semester 1
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IT research 862 (MIT 862)

Qualification	Postgraduate
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Module credits	8.00
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Prerequisites	This module is a compulsory requirement for admission of A Stream students to MIT 840
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Contact time	16 contact hours per semester
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Language of tuition	Module is presented in English
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Department	School of Information Technology
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Period of presentation	Semester 1
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Module content

Research methodologies applicable to the IT field as preparation for the mini-dissertation for the A Stream students.

Capita selecta 863 (MIT 863)

Qualification	Postgraduate
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Module credits	12.00
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Prerequisites	No prerequisites.
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Contact time	16 contact hours per semester
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Language of tuition	Module is presented in English
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Department	Informatics
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Period of presentation	Semester 1 or Semester 2
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IT financial management 864 (MIT 864)

Qualification	Postgraduate
Module credits	8.00
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Informatics
Period of presentation	Semester 1

Web trends in the library 865 (MIT 865)

Qualification	Postgraduate
Module credits	8.00
Prerequisites	No prerequisites.
Contact time	16 contact hours per year
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Year

Digital repositories 866 (MIT 866)

Qualification	Postgraduate
Module credits	8.00
Prerequisites	No prerequisites.
Contact time	16 contact hours per year
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Year

The knowledge society and international librarianship 867 (MIT 867)

Qualification	Postgraduate
Module credits	8.00
Prerequisites	No prerequisites.
Contact time	16 contact hours per year
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Year

Facilitating information retrieval and information use 868 (MIT 868)

Qualification	Postgraduate
Module credits	8.00
Prerequisites	No prerequisites.
Contact time	16 contact hours per year
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Year

IT systems in libraries 869 (MIT 869)

Qualification	Postgraduate
Module credits	8.00
Prerequisites	No prerequisites.
Contact time	16 contact hours per year
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Year

Knowledge management 872 (MIT 872)

Qualification	Postgraduate
Module credits	8.00
Prerequisites	No prerequisites.
Contact time	16 contact hours per year
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Year

Computer science in perspective 874 (MIT 874)

Qualification	Postgraduate
Module credits	6.00
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Semester 1

ICT project management 877 (MIT 877)

Qualification	Postgraduate
Module credits	5.00
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Semester 1

IT financial management 878 (MIT 878)

Qualification	Postgraduate
Module credits	6.00
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Informatics
Period of presentation	Semester 1

IT Research 879 (MIT 879)

Qualification	Postgraduate
Module credits	8.00
Prerequisites	This module is a compulsory requirement for admission of B Stream students to MIT 880
Language of tuition	Module is presented in English
Department	School of Information Technology
Period of presentation	Semester 2

Module content

Basic research methodology as preparation for the mini-dissertation for the B Stream students.

Mini-dissertation 880 (MIT 880)

Qualification	Postgraduate
Module credits	90.00
Programmes	MIT ICT Information Science (Coursework)
Prerequisites	MIT 879 (for B Stream students)
Language of tuition	Module is presented in English
Department	School of Information Technology
Period of presentation	Year

Module content

The mini-dissertation is an individual report of independent research under the guidance of a supervisor for the B Stream students.

Mini-dissertation 881 (MIT 881)

Qualification	Postgraduate
Module credits	90.00
Prerequisites	MIT 862 (for A Stream students)
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Year

Module content

The mini-dissertation is an individual report of independent research under the guidance of a supervisor for the A Stream students.

Please note: Only for the department of Information Science students.

Mini-dissertation 882 (MIT 882)

Qualification	Postgraduate
Module credits	90.00
Prerequisites	MIT 862 (for A Stream students)
Language of tuition	Module is presented in English
Department	Computer Science
Period of presentation	Year

Module content

The mini-dissertation is an individual report of independent research under the guidance of a supervisor for the A Stream students.

Please note: only for the Department of Computer Science students.

Research data management 885 (MIT 885)

Qualification	Postgraduate
Module credits	15.00
Programmes	MIT ICT Information Science (Coursework)
Prerequisites	No prerequisites.
Contact time	12 contact hours
Language of tuition	Module is presented in English
Department	Information Science

Period of presentation	Year
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Institutional repositories and virtual work environments 886 (MIT 886)

Qualification	Postgraduate
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Module credits	15.00
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Programmes	MIT ICT Information Science (Coursework)
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Prerequisites	No prerequisites.
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Contact time	12 contact hours
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Language of tuition	Module is presented in English
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Department	Information Science
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Period of presentation	Year
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The knowledge society in the Fourth Industrial Revolution 887 (MIT 887)

Qualification	Postgraduate
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Module credits	10.00
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Programmes	MIT ICT Information Science (Coursework)
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Prerequisites	No prerequisites.
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Contact time	8 contact hours per semester
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Language of tuition	Module is presented in English
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Department	Information Science
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Period of presentation	Semester 1
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Information ethics 889 (MIT 889)

Qualification	Postgraduate
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Module credits	10.00
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Programmes	MIT ICT Information Science (Coursework)
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Prerequisites	No prerequisites.
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Contact time	8 contact hours per semester
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Language of tuition	Module is presented in English
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Department	Information Science
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Period of presentation	Semester 2
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Data, information and knowledge management 890 (MIT 890)

Qualification	Postgraduate
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Module credits	15.00
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Programmes	MIT ICT Information Science (Coursework)
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Prerequisites	No prerequisites.
Contact time	12 contact hours
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Year

Facilitating information retrieval and information use 891 (MIT 891)

Qualification	Postgraduate
Module credits	15.00
Programmes	MIT ICT Information Science (Coursework)
Prerequisites	No prerequisites.
Contact time	12 contact hours
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Year

IT Research 892 (MIT 892)

Qualification	Postgraduate
Module credits	10.00
Programmes	MIT ICT Information Science (Coursework)
Prerequisites	This module is a compulsory requirement for admission of B Stream students to MIT 880.
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Semester 1

Module content

Basic research methodology as preparation for the mini-dissertation for the B Stream students.

Professional and technical communication 210 (MJJ 210)

Qualification	Undergraduate
Module credits	8.00
Programmes	BEng Mechanical Engineering BEng Mechanical Engineering ENGAGE
Prerequisites	No prerequisites.
Contact time	2 lectures per week, 2 other contact sessions per week
Language of tuition	Module is presented in English

Department	Mechanical and Aeronautical Engineering
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Period of presentation	Semester 1
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Module content

Effective communication by engineers. Verbal, written and visual communication are all covered, with a focus on presentations and technical reports as the medium of communication. Effective communication in all three aspects is achieved with an understanding of the audience influence, the structure of information, the structuring of an argument and the effective use of language. Topics covered: Plagiarism, paraphrasing, correct referencing practices and distinguishing between information sources. Business emails and meetings. Body language. Graphical display of data in graphs and slides.

Nuclear engineering 420 (MKI 420)

Qualification	Undergraduate
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Module credits	16.00
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Programmes	BEng Mechanical Engineering BEng Mechanical Engineering ENGAGE
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Prerequisites	No prerequisites.
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Contact time	1 discussion class per week, 1 practical per week, 3 lectures per week
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Language of tuition	Module is presented in English
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Department	Mechanical and Aeronautical Engineering
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Period of presentation	Semester 2
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Module content

Basic nuclear physics: definitions and concepts (nuclear reaction, binding energy, cross-sections, moderator, reflector, etc.). Basic reactor physics: diffusion equation and boundary equations, group-diffusion methods, reactor kinetics. Reactor types: pressurised water reactors, boiling water reactors, gas-cooled reactors. Nuclear fuel cycle (including waste disposal). Reactor materials: fuels, moderators, coolants, reflectors, structures, systems or components. Reactor safety: biological effects of radiation, radiation shielding, principles of nuclear plant safety, atmospheric dispersion of radioactive contamination, event-tree and fault-tree analyses of reactor systems.

Solid mechanics 321 (MKM 321)

Qualification	Undergraduate
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Module credits	16.00
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Programmes	BEng Mechanical Engineering BEng Mechanical Engineering ENGAGE
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Prerequisites	MOW 227
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Contact time	1 practical per week, 3 lectures per week
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Language of tuition	Module is presented in English
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Department	Mechanical and Aeronautical Engineering
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Period of presentation	Semester 2
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Module content

Solid mechanics, kinematics of deformation, strain tensor, traction vector, stress tensor and stress resultants. Macroscopic and infinitesimal equilibrium equations. Hooke's law for isotropic media. Strong form of Boundary Value Problem (BVP) of solid mechanics. Weak form of BVP of solid mechanics. Derivation of finite element equations using weighted residuals. Detail development of 1D elements with concepts extended to 2D and 3D. Manipulation of continuum and discrete equations using a high level programming language. Finite element modelling concepts that include Saint Venant's principle, linear superposition, symmetry, anti-symmetry, verification and validation.

Computational fluid dynamics 411 (MKM 411)

Qualification	Undergraduate
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Module credits	16.00
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Programmes	BEng Mechanical Engineering BEng Mechanical Engineering ENGAGE
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Prerequisites	(MTV 310), (MKM 321)
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Contact time	1 practical per week, 3 lectures per week
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Language of tuition	Module is presented in English
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Department	Mechanical and Aeronautical Engineering
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Period of presentation	Semester 1
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Module content

A fast review of partial differential equations, introduction to continuum mechanics, continuity equation, momentum equation, Navier- Stokes equation, energy equation, boundary conditions in thermal fluid systems, finite difference method, linear and non-linear partial differential equations, introduction to finite volume method (FVM), FVM for diffusion problems, FVM for convection-diffusion problems, introduction to pressure-velocity coupling in FVM, SIMPLE algorithm, introduction to computational fluid dynamics (CFD) software packages and their abilities, using CFD commercial software packages to solve thermal-fluid engineering problems.

Molecular and cell biology 111 (MLB 111)

Qualification	Undergraduate
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Module credits	16.00
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Programmes

BChD
BDietetics
BEd Senior Phase and Further Education and Training Teaching
BSc Biochemistry
BSc Biological Sciences
BSc Biotechnology
BSc Chemistry
BSc Computer Science
BSc Culinary Science
BSc Ecology
BSc Entomology
BSc Environmental Sciences
BSc Food Science
BSc Genetics
BSc Human Genetics
BSc Human Physiology
BSc Human Physiology, Genetics and Psychology
BSc Information and Knowledge Systems
BSc Medical Sciences
BSc Microbiology
BSc Nutrition
BSc Physics
BSc Plant Science
BSc Zoology
BScAgric Agricultural Economics and Agribusiness Management
BScAgric Animal Science
BScAgric Applied Plant and Soil Sciences
BScAgric Plant Pathology
BVSc
MBChB

Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Health Sciences Faculty of Veterinary Science
Prerequisites	A candidate who has passed Mathematics with at least 60% in the Grade 12 examination
Contact time	1 practical/tutorial per week, 4 lectures per week
Language of tuition	Module is presented in English
Department	Biochemistry, Genetics and Microbiology
Period of presentation	Semester 1

Module content

Introduction to the molecular structure and function of the cell. Basic chemistry of the cell. Structure and composition of prokaryotic and eukaryotic cells. Ultrastructure and function of cellular organelles, membranes and the cytoskeleton. General principles of energy, enzymes and cell metabolism. Selected processes, e.g. glycolysis, respiration and/or photosynthesis. Introduction to molecular genetics: DNA structure and replication, transcription, translation. Cell growth and cell division.

Molecular and cell biology 133 (MLB 133)

Qualification	Undergraduate
Module credits	8.00
Programmes	BSc Extended programme - Biological and Agricultural Sciences BSc Extended programme - Physical Sciences
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Health Sciences Faculty of Veterinary Science
Prerequisites	Admission to the relevant programme.
Contact time	2 lectures per week, Fortnightly discussions, Fortnightly practicals, Foundation Course
Language of tuition	Module is presented in English
Department	Department of Plant and Soil Sciences
Period of presentation	Semester 1

Module content

Introduction to life science and life on earth, including the importance and relevance of the Sustainable Development Goals; the scientific method, principles of microscopy, introduction to the molecular structure and function of the cell. Basic chemistry of the cell. Structure and composition of prokaryotic and eukaryotic cells.

Molecular and cell biology 143 (MLB 143)

Qualification	Undergraduate
Module credits	8.00
Programmes	BSc Extended programme - Biological and Agricultural Sciences BSc Extended programme - Physical Sciences
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Health Sciences Faculty of Veterinary Science
Prerequisites	Admission to the relevant programme.
Contact time	2 lectures per week, Fortnightly discussions, Fortnightly practicals, Foundation Course
Language of tuition	Module is presented in English
Department	Department of Plant and Soil Sciences
Period of presentation	Semester 2

Module content

Ultrastructure and function of cellular organelles, membranes and the cytoskeleton. General principles of energy, enzymes and cell metabolism including selected cellular.

Molecular and cell biology 153 (MLB 153)

Qualification	Undergraduate
Module credits	8.00
Programmes	BSc Extended programme - Biological and Agricultural Sciences BSc Extended programme - Physical Sciences
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	MLB 143
Contact time	2 lectures per week, 2 practicals/tutorials per week, Foundation Course
Language of tuition	Module is presented in English
Department	Biochemistry, Genetics and Microbiology
Period of presentation	Semester 1

Module content

Cell growth and cell division, Mendelian and human genetics, principles of molecular genetics, principles of recombinant DNA technology and its application.

Aerodynamics 780 (MLD 780)

Qualification	Postgraduate
Module credits	16.00
Programmes	BEngHons Mechanical Engineering BScHons Applied Science Mechanics
Prerequisites	No prerequisites.
Contact time	21 contact hours per semester
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 1 or Semester 2

Module content

Review of the fundamentals of thermodynamics. Introduction to compressible flows. Advanced topics in compressible flows: transonic flow and supersonic flow. Oblique shock waves, expansion waves, shock-expansion theory, wave interactions and wave drag. Linearized compressible-flow theory. Effects of heat and friction on gas flow. Design aspects of high speed aeroplanes and viscous effects. Fundamentals of hypersonic flow and high temperature gas dynamics. On completion of this module the student will be able to understand the fundamental phenomena associated with compressible flow and competently apply analytical theory to compressible flow problems

Missile aerodynamics and design 781 (MLD 781)

Qualification	Postgraduate
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Module credits	16.00
Prerequisites	(recommended) aircraft design, aerodynamics, flight mechanics
Contact time	21 contact hours per semester
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 1 or Semester 2

Module content

The aerodynamic discipline of missiles or slender bodies and general configuration design concepts, submarine, airship and munition development. Slender body theory, aerodynamics of bodies, aerodynamics of low aspect ratio wings, vortices, wing body interference, downwash, the wake and wing tail interference, aerodynamic controls, drag, stability derivatives, design considerations, performance, manoeuvring flight, store carriage and separation. Prerequisites for the course are aircraft design, subsonic and supersonic aerodynamics (including the concepts of potential flow, vortex theory, thin aerofoil theory, finite wing theory, compressible gas dynamics and shock wave theory) and flight dynamics.

Experimental methods 782 (MLD 782)

Qualification	Postgraduate
Module credits	16.00
Prerequisites	(recommended) any module where experiments are frequent (such as Physics 1)
Contact time	21 contact hours per semester
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 1 or Semester 2

Module content

Terminology, Data analysis, Uncertainty, Displacement, Strain, Pressure, Flow measurements Temperature measurements. Emphasis will be placed on the experimental process from calibration through to analyses. Different experimental techniques will be covered to showcase the process.

Unmanned aircraft systems technology 783 (MLD 783)

Qualification	Postgraduate
Module credits	16.00
Programmes	BEngHons Mechanical Engineering BScHons Applied Science Mechanics
Prerequisites	No prerequisites
Contact time	21 contact hours per semester

Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 1 or Semester 2

Module content

Introduction to Unmanned Aerial Systems, applications and examples. System breakdown and major components. Airframe and systems. Core avionics, architecture, flight control, navigation, health monitoring. Mission systems, sensors, weapons and stores, electronic warfare. Aircraft installation and integration. Ground segment, control station, take off / launch support system, landing and recovery. Command and Control, data and video link. Logistic support system. Safety and regulatory elements.

Avionics 784 (MLD 784)

Qualification	Postgraduate
Module credits	16.00
Programmes	BEngHons Mechanical Engineering BScHons Applied Science Mechanics
Prerequisites	No prerequisites.
Contact time	21 contact hours per semester
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 1 or Semester 2

Module content

Introduction to the functions performed by the avionics system in modern aircraft; the way in which these functions are mapped to the avionics components, starting from a presentation of the major avionics function, and the associated equipment and technologies: Human / Machine Interface, Flight Sensing (attitude, altitude, airspeed), Navigation (INS, SATNAV, Radio Nav), Flight Control and Guidance (autopilot), Radio Communication, Engine Management, Mission Sensors (radar, optronics), Health and Usage Monitoring. The main engineering challenges in Avionics System design, system integration, flight testing, safety justification and certification.

Gas dynamics 780 (MLG 780)

Qualification	Postgraduate
Module credits	16.00
Prerequisites	No prerequisites.
Contact time	21 contact hours per semester
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 1 or Semester 2

Module content

Fundamentals of compressible flow, one dimensional flow, oblique shock and expansion waves, quasi-one-dimensional flow, differential conservation equations for inviscid flows, unsteady wave motion, linearised flow, conical flow, 3D flow, transonic flow, hypersonic flow.

Air conditioning and refrigeration 780 (MLR 780)

Qualification Postgraduate

Module credits 16.00

Programmes [BEngHons Mechanical Engineering](#)
[BScHons Applied Science Mechanics](#)

Prerequisites No prerequisites.

Contact time 21 contact hours per semester

Language of tuition Module is presented in English

Department Mechanical and Aeronautical Engineering

Period of presentation Semester 1 or Semester 2

Module content

Comfort and indoor air quality. Psychometrics. System types and selection. Cooling and heating load calculations: conduction, radiation, convection, internal loads and thermal storage. Design of air handling unit, ducts, plant and reticulation. Control systems. Introduction to integrated system simulation.

Aeronautical structures 780 (MLT 780)

Qualification Postgraduate

Module credits 16.00

Prerequisites No prerequisites.

Contact time 21 contact hours per semester

Language of tuition Module is presented in English

Department Mechanical and Aeronautical Engineering

Period of presentation Semester 1 or Semester 2

Module content

Principles of stressed skin construction. General loads on aircraft. Static analysis of structures. Behaviour of aircraft materials. Basic Theory of elasticity. Energy methods & principles of virtual work. Stress analysis of thin-walled structures with and without thermal effects. Analysis of idealised semi-monocoque structures, boom-skin models of stiffened structures such as fuselage and wings, shear flow of idealised thin-walled sections. Fibre-reinforced composites of laminates subjected to bending and extensional stresses, thin walled composite beams. Column buckling with local instabilities, Johnson-Euler, beam columns. Plate buckling (shear, compression & bending), buckling of curved plates, skin effective width, Inter-rivet buckling, flange stability, lateral stability, crippling, inelastic buckling, buckling interaction.

Aeronautics 420 (MLV 420)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Mechanical Engineering BEng Mechanical Engineering ENGAGE
Prerequisites	MTV 310
Contact time	1 practical per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 2

Module content

Introduction to aerodynamics and aeronautics. Fundamental physical quantities of flowing gas. Equations of state. Anatomy of an airplane. Atmosphericology. Basic aerodynamics. Potential flow. Elementary compressible flow. The Kutta-Joukowski Theorem. Introduction to viscous flow. Laminar and Turbulent Boundary Layers. Skin friction. Transition Flow Separation. Airfoil nomenclature. Lift, drag and moment coefficients. Pressure coefficients. Airfoil data. Wing properties. Circulation, downwash, and induced drag. Span efficiency. Stall. High-lift devices. Drag. Elements of airplane and flight performance. Range, endurance and payload. Principles of static stability and control.

Flight mechanics 780 (MLV 780)

Qualification	Postgraduate
Module credits	16.00
Programmes	BEngHons Mechanical Engineering BScHons Applied Science Mechanics
Prerequisites	Working knowledge of MATLAB/OCTAVE/Python or similar
Contact time	21 contact hours per semester
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 1 or Semester 2

Module content

Drag: friction, pressure, induced, interference, cooling, trim, drag estimation and reduction, piston engines, propellers, gas turbines, turbojet, turboprop and turbofan engines, propfan engines, aircraft performance, take off, climb, level flight, range, flight and manoeuvre envelopes, landing, energy methods, static stability and control: stick fixed, stick free, lateral stability and control, dihedral effect, coupling, dynamic longitudinal stability, short period oscillations, phugoid oscillations, dynamic damping, flight characteristics.

Aircraft design 780 (MLW 780)

Qualification	Postgraduate
Module credits	16.00
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 1 or Semester 2

Module content

Conceptual aircraft design, the design process, sizing, airfoil and geometry considerations, thrust and wing loading, configuration layout and loft, crew and passenger considerations, propulsion, landing gear, aerodynamics, structures, weights, stability and control, performance, cost analysis, trade off studies, design proposals.

Structural control 781 (MOI 781)

Qualification	Postgraduate
Module credits	16.00
Prerequisites	MBB 780 Control systems 780
Contact time	21 contact hours per semester
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 2

Module content

Application of control techniques in order to actively control the dynamics of structures like beams and plates; pole placement technique, PID control, optimal control, feed-back control and feed-forward control; using tools like SIMULINK that can be used to simulate active control.

Optimum design 420 (MOO 420)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Mechanical Engineering BEng Mechanical Engineering ENGAGE
Prerequisites	No prerequisites.
Contact time	1 practical per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 2

Module content

Introduction to elements of computer-aided design. Formulation of the optimum design problem. Concepts used in optimum design. Linear and integer programming methods. Numerical methods used for unconstrained and constrained optimum design. Model reduction techniques. Application to interactive and practical design optimisation.

Optimum design 780 (MOO 780)

Qualification	Postgraduate
Module credits	16.00
Programmes	BEngHons Mechanical Engineering BScHons Applied Science Mechanics
Prerequisites	No prerequisites.
Contact time	21 contact hours per semester
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 2

Module content

Introduction to design and elements of computer aided design. Optimum design problem formulation. Optimum design concepts. Linear programming methods. Integer programming. Numerical methods for unconstrained and constrained optimum design. Model reduction. Interactive and practical design optimisation.

Manufacturing and design 217 (MOW 217)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Industrial Engineering BEng Industrial Engineering ENGAGE BEng Mechanical Engineering BEng Mechanical Engineering ENGAGE
Prerequisites	MGC 110
Contact time	3 lectures per week, 4 tutorials per week
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 1

Module content

Detailed exposure to manufacturing processes, and appropriate selection of manufacturing processes. Detailed exposure to machine elements, including belts, chains and bearings. Selection of standard components. Conceptual framework for design process including life cycle, ergonomics, component and material selection, manufacturing considerations, and evaluation of alternatives.

Structural design 227 (MOW 227)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Mechanical Engineering BEng Mechanical Engineering ENGAGE
Prerequisites	SWK 122
Contact time	3 lectures per week, 4 tutorials per week
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 2

Module content

Analyse statically determinate structures to obtain section forces and moments and stress distributions. Axial loading, pure shear, torsion and bending. Stress and strain transformations. Derivation of stress transformation equations. Mohr's circle. Failure criteria. Fatigue strength design. Introduction to code design, safety factors. All analysis techniques are applied to the open-ended design of hoisting systems and ropes, symmetric beams, shafts, springs, bolts and welds.

Machine design 312 (MOW 312)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Mechanical Engineering BEng Mechanical Engineering ENGAGE
Prerequisites	MOW 217, (MOW 227)
Contact time	3 lectures per week, 3 tutorials per week
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 1

Module content

Within the framework of system engineering the following themes are introduced: Ergonomics, pressure vessels (introduction to code design), structural design, welding and bonding, heat treatment, non-destructive testing, couplings, clutches, brakes, gears, contact stresses and lubrication. Safety factors are considered through all themes. Open-ended subsystem design using the following elements: welds, gears and gear systems.

Simulation-based design 323 (MOW 323)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Mechanical Engineering BEng Mechanical Engineering ENGAGE

Prerequisites	(MSD 210), MOW 227
Contact time	3 lectures per week, 5 tutorials per week
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 2

Module content

Computational dynamics analysis of mechanisms, linkages and cams. Structural computational analysis using finite element software. Systems engineering and functional analysis. Open-ended multidisciplinary design and design improvement of products and systems.

Design project 410 (MOX 410)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Mechanical Engineering BEng Mechanical Engineering ENGAGE
Prerequisites	MOW 312 GS and MOW 323 GS
Contact time	8 tutorials per week
Language of tuition	Separate classes for Afrikaans and English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 1

Module content

A comprehensive design and synthesis of components and systems relating to the mechanical engineering discipline. The design process includes aspects such as identifying and formulating the problem, functional and requirement analysis, conceptual design, detail design and analysis, ensuring that design meets applicable standards, codes of practice and legislation, techno-economic analysis (e.g. cost analysis) and considering the impacts and benefits of the design (e.g. social, environmental, health and safety). Professional and general communication of the design through written and oral communication.

Design 780 (MOX 780)

Qualification	Postgraduate
Module credits	16.00
Prerequisites	No prerequisites.
Contact time	21 contact hours per semester
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 1

Module content

The objective of the module is to enable the engineer to plan and control design and development projects. System engineering. All aspects, from the concept phase to phasing out of the projects as well as supporting theory are covered. Technology forecasting: explanation and application. Project viability studies: explanation and application. Applicable practicals and assignments are used to equip the student to apply the theory. Student's conducting a techno-economic study is used to integrate the different aspects of the subject.

Specialised design 781 (MOX 781)

Qualification	Postgraduate
Module credits	16.00
Prerequisites	No prerequisites.
Contact time	21 contact hours per semester
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 1 or Semester 2

Module content

This module allows the Head of the Department of Mechanical and Aeronautical Engineering to arrange a short course on a specialized nature in mechanical or aeronautical engineering, typically (but not limited to) a course presented by a visiting academic. The total volume of work that is to be invested in this module by an average student must be 160 hours. The body of knowledge studied must be of a specialized and advanced nature, at the level of the other postgraduate modules offered by the Department.

Specialised design 782 (MOX 782)

Qualification	Postgraduate
Module credits	16.00
Prerequisites	No prerequisites.
Contact time	21 contact hours per semester
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 1 or Semester 2

Module content

This module allows the Head of the Department of Mechanical and Aeronautical Engineering to arrange a short course on a specialized nature in mechanical or aeronautical engineering, typically (but not limited to) a course presented by a visiting academic. The total volume of work that is to be invested in this module by an average student must be 160 hours. The body of knowledge studied must be of a specialized and advanced nature, at the level of the other postgraduate modules offered by the Department.

Programming and information technology 213 (MPR 213)

Qualification	Undergraduate
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Module credits	16.00
Programmes	BEng Chemical Engineering BEng Chemical Engineering ENGAGE BEng Civil Engineering BEng Civil Engineering ENGAGE BEng Industrial Engineering BEng Industrial Engineering ENGAGE BEng Mechanical Engineering BEng Mechanical Engineering ENGAGE BEng Metallurgical Engineering BEng Metallurgical Engineering ENGAGE BEng Mining Engineering BEng Mining Engineering ENGAGE
Prerequisites	No prerequisites.
Contact time	2 practicals per week, 4 lectures per week
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 1

Module content

Spreadsheet applications: Formulas and calculations, named ranges, plotting and trend lines, goal seek, linear programming, importing and exporting data, data navigation and filtering. Programming fundamentals: Names and objects, conditional and unconditional looping, branching, functions, modules, packages, reading and writing data files, graphical output (plotting). Solving simple problems using a high level programming language to develop, code and debug programs. Solving complex problems by breaking it down into a number of simple problems using concepts such as functions, modules and available packages. Programming principles are developed through solving mathematics and physics problems.

Practical training 315 (MPY 315)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Mechanical Engineering BEng Mechanical Engineering ENGAGE
Prerequisites	No prerequisites.
Contact time	1 other contact session per week
Language of tuition	Separate classes for Afrikaans and English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 1

Module content

Prescribed practical training in the industry during or at the end of the second year. The aim is exposure to engineering equipment and processes, working environment of craftsmen and personnel relations. Duration at least 240 hours of work. Perform case study on personnel management and submit together with a satisfactory report on the practical training, to the Faculty Administration within one week of registration. Attend two (2) industry visits in the first semester and two (2) industry visits in the second semester. Attend at least six (6) guest lectures through the year.

Practical training 415 (MPY 415)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Mechanical Engineering BEng Mechanical Engineering ENGAGE
Prerequisites	No prerequisites.
Contact time	1 other contact session per week
Language of tuition	Separate classes for Afrikaans and English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 1

Module content

During or at the end of the third year of study, students in Mechanical Engineering undergo prescribed practical training in the industry. The purpose is the execution of small projects on engineering assistant level with exposure to the various relevant functions in the organisation. The duration is at least 240 hours of work. A case study on occupational health and safety must be done in this period and submitted to the department together with a satisfactory report on the practical training within one week of registration. Students must also attend two (2) industry visits in the first semester and two (2) industry visits in the second semester as well as attend at least six (6) guest lectures through the year.

Research project 412 (MRN 412)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Mechanical Engineering BEng Mechanical Engineering ENGAGE
Prerequisites	Finalists only
Contact time	8 other contact sessions per week
Language of tuition	Separate classes for Afrikaans and English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 1

Module content

The module involves the management of the execution of a project that produces knowledge and understanding of a phenomenon, conclusions and a recommended course of action. The project is undertaken under the supervision of a staff member with the student ultimately taking responsibility for the management of and execution of the project. The student should be able to demonstrate competence in designing and conducting investigations and experiments and adherence to well defined time-lines and work breakdown structures. An acceptable process consists of but is not restricted to: (a) planning and conducting of investigations and experiments; (b) conducting of a literature search and critically evaluating material. The student should be able to demonstrate competence in engaging in independent learning through well-developed skills by: (a) reflecting on own learning and determining learning requirements and strategies; (b) sourcing and evaluating information; (c) determining learning requirements and strategies; (d) accessing, comprehending and applying knowledge acquired outside formal instruction; (e) critically challenging assumptions and embracing new thinking as well as communicating progress on a regular basis.

Research project 422 (MRN 422)

Qualification	Undergraduate
Module credits	24.00
Programmes	BEng Mechanical Engineering BEng Mechanical Engineering ENGAGE
Prerequisites	Finalist only, MRN 412
Contact time	12 other contact sessions per week
Language of tuition	Separate classes for Afrikaans and English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 2

Module content

The module involves the management of the execution of a project that produces knowledge and understanding of a phenomenon, conclusions and a recommended course of action. The project is undertaken under the supervision of a staff member with the student ultimately taking responsibility for the management of and execution of the project. This module follows onto MSC 412 and deals with the same topic in the same year. The student should be able to demonstrate competence in designing and conducting investigations and experiments and adherence to well defined time-lines and work breakdown structures. An acceptable process consists of but is not restricted to: (a) understanding of the stated problem, (b) developing a work breakdown structure, (c) performing the necessary analyses; (d) selecting and using appropriate equipment or software; (e) construction and instrumentation of an experimental set-up; (f) taking measurements; (g) analysing, interpreting and deriving information from data; (h) drawing conclusions based on evidence; (i) communicating the purpose, process and outcomes in a technical report, presentation and poster.

Smart materials 780 (MSA 780)

Qualification	Postgraduate
Module credits	16.00
Prerequisites	No prerequisites.

Contact time	10 lectures per week
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 1

Dynamics 210 (MSD 210)

Qualification	Undergraduate
Module credits	16.00

Programmes	BEng Electrical Engineering
	BEng Electrical Engineering ENGAGE
	BEng Electronic Engineering
	BEng Electronic Engineering ENGAGE
	BEng Industrial Engineering
	BEng Industrial Engineering ENGAGE
	BEng Mechanical Engineering
	BEng Mechanical Engineering ENGAGE
	BEng Metallurgical Engineering
	BEng Metallurgical Engineering ENGAGE
	BEng Mining Engineering
	BEng Mining Engineering ENGAGE

Prerequisites	FSK 116 or FSK 176 and SWK 122 and WTW 256 #
Contact time	2 tutorials per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 1

Module content

Kinetics of systems of particles, Newton's 2nd law generalised for a system of particles, rate of change of momentum and angular momentum relations, work-energy relations, conservation laws, steady mass flow. Plane kinematics of rigid bodies, rotation, translation, general 2D motion, relative motion analysis. Moments and products of inertia. Plane kinetics of rigid bodies, equations of motion, rotation, translation, general 2D motion, work-energy relations. Vibration and time response.

Theory of elasticity 780 (MSE 780)

Qualification	Postgraduate
Module credits	16.00
Prerequisites	No prerequisites.
Contact time	21 contact hours per semester
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering

Period of presentation Semester 1 or Semester 2

Module content

Mechanics of elastic deformable bodies, based on the fundamental concepts of modern continuum mechanics: kinematics, balance laws, constitutive equations; classical small-deformation theory; formulation of boundary-value problems of linear elastostatics; plane problem of elastostatics; variational formulations, minimum principles.

Fracture mechanics 780 (MSF 780)

Qualification Postgraduate

Module credits 16.00

Programmes [BEngHons Mechanical Engineering](#)
[BScHons Applied Science Mechanics](#)

Prerequisites No prerequisites.

Contact time 21 contact hours per semester

Language of tuition Module is presented in English

Department Mechanical and Aeronautical Engineering

Period of presentation Semester 2

Module content

Historical development; Linear Elastic Fracture Mechanics (LEFM): Stress concentrations and singularities, stress intensity factor, stability of crack propagation; Elasto-plastic fracture mechanics: crack tip plasticity, small scale yielding, measurement of K_{Ic} , J-integral; Fatigue crack growth: Paris Law; life prediction; combined mode fracture, strain energy density methods.

Numerical thermoflow 780 (MSM 780)

Qualification Postgraduate

Module credits 16.00

Programmes [BEngHons Mechanical Engineering](#)
[BScHons Applied Science Mechanics](#)

Prerequisites No prerequisites.

Contact time 21 contact hours per semester

Language of tuition Module is presented in English

Department Mechanical and Aeronautical Engineering

Period of presentation Semester 1

Module content

Fluid Mechanics refresher (governing equations, boundary conditions, application of inviscid, laminar and turbulent flow). Methods of weighted residuals (finite element, finite volume and difference methods). Mesh generation and boundary conditions: Types of mesh structured and unstructured mesh generation and application (inviscid flow, heat conduction etc.). Heat conductions: Governing equations, discretisation, finite approximation, solution methods (Gauss-Seidel, Tri-diagonal matrix algorithm) etc. This module is suited to postgraduate students doing research in thermofluids and who wants to use available CFD codes or who wants to write their own codes to solve fluid mechanics, heat and mass transfer problems.

Numerical thermoflow 781 (MSM 781)

Qualification	Postgraduate
Module credits	16.00
Programmes	BEngHons Mechanical Engineering BScHons Applied Science Mechanics
Prerequisites	MSM 780 Numerical thermoflow 780
Contact time	21 contact hours per semester
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 2

Module content

The Efficient Solvers: Background, multigrid theory and detailed description of the algorithm. Finite Volume method: Understand the governing equations, general form of the transport equations, Gauss's theorem and the finite volume discretisation. Iterative solution algorithm: Pressure-velocity coupling, types of grids, unsteady flows, multiple phases. Finite Volume Discretisation: Diffusion term, convection term and source term for steady flows. Convection-diffusion problems: Boundary conditions, higher order discretisation, accuracy / stability. Solution Algorithm for Pressure-Velocity coupling: SIMPLE, SIMPLER, SIMPLEC and PISO. Laminar, transitional and turbulent flow: Background and theory. Turbulence modelling and examples: Definition of turbulence, turbulence modelling approaches, turbulence models (zero-equation models, one equation, two equation, Reynolds Stress Model (RSM), Large Eddy Simulation, wall function approach), turbulence modelling guidelines. Recent CS developments: Current state of the art in turbulence modelling etc. Viscous boundary meshes: Background and objectives, internal and external flow, turbulence modelling considerations.

Research study 732 (MSS 732)

Qualification	Postgraduate
Module credits	32.00
Programmes	BEngHons Mechanical Engineering BScHons Applied Science Mechanics BScHons Applied Science Mechanics: Physical Asset Management
Prerequisites	No prerequisites.
Contact time	12 other contact sessions per week

Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 1 or Semester 2

Module content

*This is a compulsory research module.

This module allows a student to do research on a certain topic in mechanical or aeronautical engineering, as specified by a lecturer in the Department of Mechanical and Aeronautical Engineering, on an individual basis, under the supervision of that lecturer. The study should be seen as a precursor to the master's degree research that may follow the honours degree. The total volume of work that is to be invested in this module by an average student must be 320 hours. The body of knowledge studied must be of an advanced nature, at the level of the other postgraduate modules offered by the Department. Normal requirements for assessment that include the use of an external examiner apply to this module also.

Independent study 781 (MSS 781)

Qualification	Postgraduate
Module credits	16.00
Prerequisites	No prerequisites.
Contact time	21 contact hours per semester
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 1 or Semester 2

Independent study 782 (MSS 782)

Qualification	Postgraduate
Module credits	16.00
Prerequisites	No prerequisites.
Contact time	10 lectures per week
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 1 or Semester 2

Module content

This module allows a student to study a certain body of knowledge in mechanical or aeronautical engineering, as specified by a lecturer in the Department of Mechanical and Aeronautical Engineering, on an individual basis, under the supervision of that lecturer. The total volume of work that is to be invested in this module by an average student must be 160 hours. The body of knowledge studied must be of an advanced nature, at the level of the other postgraduate modules offered by the Department. Normal requirements for assessment that include the use of an external examiner apply to this module also.

Material studies 223 (MST 223)

Qualification	Undergraduate
Module credits	8.00
Programmes	BSc Interior Architecture
Prerequisites	No prerequisites.
Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	Architecture
Period of presentation	Semester 2

Module content

Introduction to materials with applications in the field of interior design: material families, basic properties and selection. Wall (partition), ceiling and floor finishes. Window treatments. Ceramics as architectural finishes. Surface theory 1 (including colour and interior paint applications).

Material studies 313 (MST 313)

Qualification	Undergraduate
Module credits	8.00
Programmes	BSc Interior Architecture
Prerequisites	TKS 212 and MST 223
Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	Materials Science and Metallurgical Engineering
Period of presentation	Semester 1

Module content

Unconventional construction materials: properties, applications.

Material studies 323 (MST 323)

Qualification	Undergraduate
Module credits	8.00
Programmes	BSc Interior Architecture
Prerequisites	MST 313
Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	Architecture
Period of presentation	Semester 2

Module content

Application of materials in artificial environments:

- Development of modern materials and processes in product design
- Joint theory
- New applications in technical textiles, polymers and other artificial materials
- Material selection and technical development in conjunction with projects in design (ONT 303) and construction (KON 320)

Fatigue 780 (MSV 780)

Qualification	Postgraduate
Module credits	16.00
Programmes	BEngHons Mechanical Engineering BScHons Applied Science Mechanics
Prerequisites	No prerequisites.
Contact time	21 contact hours per semester
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 1 or Semester 2

Module content

Fatigue principles addressing both elasticity and plasticity; notch effects; variable amplitude loading conditions; multi-axial fatigue and weld fatigue.

Fluid mechanics 780 (MSX 780)

Qualification	Postgraduate
Module credits	16.00
Programmes	BEngHons Mechanical Engineering BScHons Applied Science Mechanics
Prerequisites	No prerequisites.
Contact time	21 contact hours per semester
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 1

Module content

Mathematical preliminaries: historical overview, scalar, vector and tensor algebra (in context of partial differential equations), Green's lemma and the Divergence theorem, Eulerian/Lagrangian representations, derivative of a function, Reynolds transport theorem. Governing equations: viscous compressible and incompressible flow, derivation of conservation of mass, derivation of conservation of momentum, boundary conditions, mathematical characteristics, non-dimensionalisation. Viscous compressible and incompressible flow: derivation of conservation of mass, derivation of conservation of momentum, boundary conditions, mathematical characteristics, non-dimensionalisation.

Advanced fluid mechanics 781 (MSX 781)

Qualification	Postgraduate
Module credits	16.00
Prerequisites	MSX 780 Fluid mechanics 780
Contact time	21 contact hours per semester
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 2

Module content

Exact solutions: potential flow, Couette flow, Poiseuille flow and combined Couette-Poiseuille flow, laminar boundary layers (similarity solutions for flat plate flow). Stability of laminar flows: introduction, linearised stability, transition to turbulence, approximate prediction of transition. Turbulent flow: Reynolds averaged equations, two-dimensional turbulent-boundary-layer equations, velocity profiles, turbulent flow in ducts, flat plate flow, turbulence modelling.

Structural mechanics 310 (MSY 310)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Mechanical Engineering BEng Mechanical Engineering ENGAGE
Prerequisites	MOW 227, (WTW 256)
Contact time	1 practical per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 1

Module content

Introduction of stress tensor. 3D stress and strain transformation. Eigenvalue/vector analysis for principal stresses and strains. Experimental strain measurements. Stress-strain relations. Strain energy. Thin-walled cylinders. Statically indeterminate stress systems. Bending stress, slope and deflection of beams, shear center, non-symmetric beams, composite beams, Castigliano's theorem. Statically indeterminate beams. Buckling instability. Yield criteria. Elementary plasticity. Structural steel design SANS code. Fracture mechanics. Fatigue.

Specialised structural mechanics 781 (MSY 781)

Qualification	Postgraduate
Module credits	16.00
Prerequisites	No prerequisites.
Contact time	21 contact hours per semester
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 1 or Semester 2

Module content

This module allows the Head of the Department of Mechanical and Aeronautical Engineering to arrange a short course on a specialized nature in mechanical or aeronautical engineering, typically (but not limited to) a course presented by a visiting academic. The total volume of work that is to be invested in this module by an average student must be 160 hours. The body of knowledge studied must be of a specialized and advanced nature, at the level of the other postgraduate modules offered by the Department.

Specialised structural mechanics 782 (MSY 782)

Qualification	Postgraduate
Module credits	16.00
Prerequisites	No prerequisites.
Contact time	21 contact hours per semester
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 1 or Semester 2

Module content

This module allows the Head of the Department of Mechanical and Aeronautical Engineering to arrange a short course on a specialized nature in mechanical or aeronautical engineering, typically (but not limited to) a course presented by a visiting academic. The total volume of work that is to be invested in this module by an average student must be 160 hours. The body of knowledge studied must be of a specialized and advanced nature, at the level of the other postgraduate modules offered by the Department.

Experimental structural dynamics 783 (MSY 783)

Qualification	Postgraduate
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Module credits	16.00
Prerequisites	A working knowledge of MATLAB/OCTAVE
Contact time	21 contact hours per semester
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 1

Module content

Spatial, modal and response models of structures, frequency response functions and the relationships between spatial, modal and response models for single degree of freedom systems and multi-degree of freedom systems, modal analysis, operational modal analysis, updating finite element models.

Dissertation: Metallurgy 890 (MTG 890)

Qualification	Postgraduate
Module credits	180.00
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Materials Science and Metallurgical Engineering
Period of presentation	Year

Thesis: Metallurgy 990 (MTG 990)

Qualification	Postgraduate
Module credits	360.00
Programmes	PhD Metallurgy
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Materials Science and Metallurgical Engineering
Period of presentation	Year

Fluid mechanics 310 (MTV 310)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Mechanical Engineering BEng Mechanical Engineering ENGAGE BEng Mining Engineering BEng Mining Engineering ENGAGE
Prerequisites	No prerequisites.
Contact time	1 practical per week, 3 lectures per week

Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 1

Module content

Introduction: Liquids and gases, pressure, viscosity, temperature. Fluid statics and pressure measurement. Introduction to control volume method for mass, momentum and energy conservation. Bernoulli equation. Differential approach: Navier-Stokes and continuity equations. Similarity and dimensional analysis. Flow in pipes and channels: friction coefficients and Reynolds number, pressure drop; laminar, turbulent and transitional flow. Flow over bodies: drag and lift. Experimental techniques in fluid mechanics.

Heat transfer 410 (MTV 410)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Mechanical Engineering BEng Mechanical Engineering ENGAGE
Prerequisites	No prerequisites.
Contact time	1 practical per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 1

Module content

Introduction to basic thermodynamic heat transfer concepts. Conduction (steady state and transient), heat resistance networks. Conduction in two dimensions. Convective heat transfer: forced convection (external and internal), natural convection. Boiling and condensation. Thermal radiation. Heat exchangers: classification, Parallel flow and counterflow heat exchangers; double-pass, multi-pass and cross-flow heat exchangers; LMTD method, Effectiveness-NTU method, selection of heat exchangers. Experimental techniques in heat transfer.

Thermal and fluid machines 420 (MTV 420)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Mechanical Engineering BEng Mechanical Engineering ENGAGE
Prerequisites	MTV 310, (MTX 311)
Contact time	1 practical per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 1 or Semester 2

Module content

Rotary Turbomachines: Fundamental principles of fluid dynamics and thermodynamics applicable to the rotating turbomachinery components i.e. gas and steam turbines, compressors, hydraulic turbines, and pumps. Classifications and basic components in turbomachines. Euler equations for turbines, compressors, and pumps. Estimations of work and power, and thermal energy losses and efficiencies in turbomachinery components. Basic theory for wind turbine power and Betz's method.

Power Cycles: Fundamental principles of fluid dynamics and thermodynamics applicable to the steam and gas turbine power cycles, internal combustion engine cycles, and reciprocating compressor cycles. Basic components in steam and gas turbine power plants. Power estimations in conventional power cycles, combined cycles, binary cycles, cogeneration plants, and organic Rankine cycles. Thermal energy losses and efficiencies in power cycles. Air-flow duct network and fan selection curves for duct system

Specialised thermoflow 780 (MTV 780)

Qualification	Postgraduate
Module credits	16.00
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 1 or Semester 2

Module content

This module allows the Head of the Department of Mechanical and Aeronautical Engineering to arrange a short course on a specialized nature in mechanical or aeronautical engineering, typically (but not limited to) a course presented by a visiting academic. The total volume of work that is to be invested in this module by an average student must be 160 hours. The body of knowledge studied must be of a specialized and advanced nature, at the level of the other postgraduate modules offered by the Department.

Specialised thermoflow 781 (MTV 781)

Qualification	Postgraduate
Module credits	16.00
Prerequisites	No prerequisites.
Contact time	21 contact hours per semester
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 1 or Semester 2

Module content

This module allows the Head of the Department of Mechanical and Aeronautical Engineering to arrange a short course on a specialized nature in mechanical or aeronautical engineering, typically (but not limited to) a course presented by a visiting academic. The total volume of work that is to be invested in this module by an average student must be 160 hours. The body of knowledge studied must be of a specialized and advanced nature, at the level of the other postgraduate modules offered by the Department.

Thermodynamics 221 (MTX 221)

Qualification Undergraduate

Module credits 16.00

Programmes [BEng Industrial Engineering](#)
[BEng Industrial Engineering ENGAGE](#)
[BEng Mechanical Engineering](#)
[BEng Mechanical Engineering ENGAGE](#)
[BEng Mining Engineering](#)
[BEng Mining Engineering ENGAGE](#)

Prerequisites FSK 116 or FSK 176

Contact time 1 practical per week, 1 tutorial per week, 3 lectures per week

Language of tuition Module is presented in English

Department Mechanical and Aeronautical Engineering

Period of presentation Semester 2

Module content

Application overview. Concepts: system, control mass, control volume, property, state, process, cycles, mass, volume, density, pressure, pure substances, property tables, ideal gases, work and heat, internal energy, enthalpy, specific heat capacity. First law of thermodynamics for control masses and control volumes. Conservation of mass. Processes: isothermal, polytropic, adiabatic, isentropic. Second law of thermodynamics and entropy for control masses and control volumes. Introduction to power cycles . Experimental techniques in thermodynamics.

Thermodynamics 311 (MTX 311)

Qualification Undergraduate

Module credits 16.00

Programmes [BEng Mechanical Engineering](#)
[BEng Mechanical Engineering ENGAGE](#)

Prerequisites MTX 221

Contact time 1 practical per week, 3 lectures per week

Language of tuition Module is presented in English

Department Mechanical and Aeronautical Engineering

Period of presentation Semester 1

Module content

Third Law of Thermodynamics, availability and useful work. Ideal and real gases. Compressible flow: conservation laws, characteristics of compressible flow, normal shock waves, nozzles and diffusers. Power cycles: classification, internal combustion engine cycles (Otto and Diesel), vapour power cycles (Brayton, Rankine), refrigeration cycles (Reversed Carnot cycle, Reversed Brayton cycle, ammonia absorption cycle) and heat pump cycles. Mixtures of gases: perfect gas mixture, water/air mixtures and processes (psychrometry). Heating and cooling load calculations, basic refrigeration and air-conditioning systems. Combustion: fuels, air-fuel ratios, heat of formation, combustion in internal combustion engines.

Thermodynamics 780 (MTX 780)

Qualification	Postgraduate
Module credits	8.00
Prerequisites	No prerequisites.
Contact time	1 lecture per week
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 1

Advanced thermodynamics and energy systems 781 (MTX 781)

Qualification	Postgraduate
Module credits	16.00
Programmes	BEngHons Mechanical Engineering BScHons Applied Science Mechanics
Prerequisites	No prerequisites.
Contact time	21 contact hours per semester
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 1 or Semester 2

Module content

Fundamental concepts of thermodynamics, total flow exergy, restricted dead state and unconstrained equilibrium state, heat transfer, fluid flow and chemical irreversibilities, thermodynamic optimisation, irreversibility distribution ratio, lost exergy, application of entropy generation minimisation (EGM) technique to the fundamentals of power generation, solar power, wind power, and low temperature refrigeration.

Reactor coolant flow and heat transfer 782 (MUA 782)

Qualification	Postgraduate
Module credits	16.00

Programmes	BEngHons Mechanical Engineering BScHons Applied Science Mechanics
Prerequisites	MUA 783
Contact time	21 contact hours per semester
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 2

Module content

Design of reactor coolant system, heat sources in reactor systems, heat transmission principles, heat transmission in systems with internal sources, temperature distribution along path of reactor coolant flow, heat transfer characteristics of fluids, heat transfer to boiling liquids, heat transfer characteristics of gasses.

Reactor engineering science 783 (MUA 783)

Qualification	Postgraduate
Module credits	16.00
Programmes	BEngHons Mechanical Engineering BScHons Applied Science Mechanics
Prerequisites	No prerequisites.
Contact time	21 contact hours per semester
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 1

Module content

Atomic structure, nuclear energy and nuclear forces, nuclear fission, nuclear reactions and radiation, energy removal, nuclear reactor systems, radiation protection, radiation shielding, meteorology, reactor safety analysis.

Reactor physics 784 (MUA 784)

Qualification	Postgraduate
Module credits	16.00
Programmes	BEngHons Mechanical Engineering BScHons Applied Science Mechanics
Prerequisites	MUA 783 Reactor engineering science 783#
Contact time	21 contact hours per semester
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 1

Module content

Probability concepts and nuclear cross sections, multiplication factor and neutron flux, slowing-down process in the infinite medium, diffusion theory the homogeneous one-velocity reactor, Fermi age theory: the homogeneous multi-velocity reactor, transport theory, reflected reactors, reactor kinetics, heterogeneous reactors, control-rod theory.

Reactor materials engineering 785 (MUA 785)

Qualification	Postgraduate
Module credits	16.00
Programmes	BEngHons Mechanical Engineering BScHons Applied Science Mechanics
Prerequisites	MUA 783 Reactor engineering science 783#
Contact time	21 contact hours per semester
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 1

Module content

Overview of the functions of the various classes of nuclear materials, elastic deformation, yielding and use of texture in nuclear components, atomic processes in plastic deformation and radiation damage, strength of engineering materials.

Reactor materials engineering 786 (MUA 786)

Qualification	Postgraduate
Module credits	16.00
Programmes	BEngHons Mechanical Engineering BScHons Applied Science Mechanics
Prerequisites	MUA 785 Reactor materials engineering 785
Contact time	21 contact hours per semester
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 2

Module content

Creep deformation, fracture processes and metallurgical fracture mechanics, fatigue fracture in nuclear materials, fabrication processes of nuclear materials.

Reactor stress analysis 787 (MUA 787)

Qualification	Postgraduate
Module credits	16.00

Prerequisites	MUA 783 Reactor engineering science 783
Contact time	21 contact hours per semester
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 2

Module content

General considerations, simple tension, bending in straight beams, torsion, plane stress and strain, strain energy, experimental stress analysis, rotational symmetry, stresses in flat plates, thermal stresses, beams on elastic foundations, buckling, design considerations.

Fossil fuel power stations 420 (MUU 420)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Mechanical Engineering BEng Mechanical Engineering ENGAGE
Prerequisites	No prerequisites.
Contact time	1 practical per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 2

Module content

This module contains a comprehensive study of all mechanical systems and processes of a fossil fuel power station. Analysis of steam cycles, combined cycle power generation, fuels and combustion, the draught group, steam generators and turbines, condenser, feedwater and circulating water systems, coal and ash handling, compressor plant, water treatment, the importance of HVAC, control and instrumentation, control philosophies and environmental considerations.

Fossil fuel power stations 781 (MUU 781)

Qualification	Postgraduate
Module credits	16.00
Programmes	BEngHons Mechanical Engineering BScHons Applied Science Mechanics BScHons Applied Science Mechanics: Physical Asset Management
Prerequisites	No prerequisites.
Contact time	13 lectures per week
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering

Period of presentation	Semester 2
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Module content

This module contains a comprehensive study of all mechanical systems and processes of a fossil fuel power station. The module will include the analysis of steam cycles, combined cycle power generation, fuels and combustion, combustion mechanisms, combustion equipment and firing methods, the draught group, steam generators, steam turbines, condenser, feed water and circulating water systems, coal handling, ash handling, compressor plant, water treatment, the importance of HVAC, control and instrumentation, control philosophies and environmental considerations.

Vehicle engineering 420 (MVE 420)

Qualification	Undergraduate
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Module credits	16.00
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Programmes	BEng Mechanical Engineering BEng Mechanical Engineering ENGAGE
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Prerequisites	No prerequisites.
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Contact time	1 practical per week, 3 lectures per week
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Language of tuition	Module is presented in English
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Department	Mechanical and Aeronautical Engineering
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Period of presentation	Semester 2
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Module content

Tyres: Construction, forces and moments, side force generation, rolling resistance, dynamic characteristics, tractive effort, slip, soft soil characteristics. Vehicle performance: equations of motion, supply and demand, forces acting on the vehicle, prediction of top speed, acceleration, braking, gradient ability and fuel consumption. Vehicle suspension systems: suspension concepts, kinematics, dynamic characteristics. Ride comfort: springs, dampers, suspension models, human response to vibration. Handling: steering systems, low-speed handling, steady-state handling, dynamic handling, under/oversteer, handling tests.

Vehicle dynamics 780 (MVI 780)

Qualification	Postgraduate
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Module credits	16.00
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Programmes	BEngHons Mechanical Engineering BScHons Applied Science Mechanics
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Prerequisites	No prerequisites.
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Contact time	21 contact hours per semester
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Language of tuition	Module is presented in English
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Department	Mechanical and Aeronautical Engineering
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Period of presentation	Semester 1
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Module content

Tyres: Characteristics and tyre models used in simulation of ride comfort and handling. Road inputs: Classification of roads. Road profiles. Road roughness. Suspension components: springs, dampers. Controllable suspension systems. Modelling aspects. Human reaction: Human response to vibration. Driver models. Human reaction times. Vertical vehicle dynamics (ride comfort): Vibration levels in a vehicle. Simulation of ride comfort. Effect of seat characteristics on vibration levels. Test and evaluation procedures. Lateral vehicle dynamics (handling): Simulation of steady state and dynamic handling. Rollover propensity. Test procedures. Computer applications: Application of computer codes in the analysis of vehicle dynamics.

Fluid machines 780 (MVM 780)

Qualification	Postgraduate
Module credits	8.00
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 1

Vibration and noise 320 (MVR 320)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Mechanical Engineering BEng Mechanical Engineering ENGAGE
Prerequisites	(MSD 210)
Contact time	1 practical per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 2

Module content

Introduction to vibration: basic concepts, classification, modelling elements. Single degree of freedom systems: undamped and damped free vibration, undamped and damped harmonic motion, non-periodic excitation, numerical integration. Multidegree of freedom systems: discretisation, eigenproblem, co-ordinate coupling. Vibration control: balancing, isolation, absorbers. Vibration and sound measurement: signal analysis, modal testing, vibration monitoring. Continuum systems: string, bar, rod. Sound and noise: metrics, measurement, legislation.

Manufacturing systems 311 (MVS 311)

Qualification	Undergraduate
Module credits	16.00

Programmes	BEng Industrial Engineering BEng Industrial Engineering ENGAGE
Prerequisites	No prerequisites.
Contact time	3 lectures per week, 3 tutorials per week
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 1

Module content

Modern manufacturing of plastic products, powder metallurgy, micro-electronic manufacturing and non-traditional machining. Quality control by work- holding devices, measurement, inspection and testing and determination of process capability. Manufacturing automation, rapid prototyping and free form fabrication. Manufacturing systems design concepts like Jobshop, Flowshop, Leanshop with linked cells, Projectshop and continuous processing.

Vehicle manufacturing 780 (MVV 780)

Qualification	Postgraduate
Module credits	8.00
Prerequisites	No prerequisites.
Contact time	1 lecture per week
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 1

Numerical methods 420 (MWN 420)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Mechanical Engineering
Prerequisites	No prerequisites.
Contact time	1 practical per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 2

Module content

Solution of systems of linear algebraic equations. Both iterative and direct methods are treated. Solutions are applied to both small and large scale systems. Solutions of systems of nonlinear equations. Eigenvalue problems. Numerical approximation strategies. Numerical integration and differentiation. Numerical solutions to initial-value problems for ordinary differential equations, boundary-value problems for ordinary differential equations and partial-differential equations.

Numerical methods 780 (MWN 780)

Qualification	Postgraduate
Module credits	16.00
Programmes	BEngHons Mechanical Engineering BScHons Applied Science Mechanics
Prerequisites	No prerequisites.
Contact time	21 contact hours per semester
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 1 or Semester 2

Module content

Solving systems of linear algebraic equations using direct and iterative methods from small to large scale systems. Numerical solutions of nonlinear systems of equations. Solving eigenvalue problems. Numerical approximation strategies. Numerical differentiation. Numerical Integration. Numerical solutions to initial-value problems for ordinary differential equations. Numerical solutions to boundary-value problems for ordinary differential equations. Numerical solutions to partial-differential equations.

Research methodology 780 (MWX 780)

Qualification	Postgraduate
Module credits	16.00
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 1 or Semester 2

Module content

The independent study of research of research methodology. The study necessary to complete and submit the literature review for an MEng dissertation.

Nano and micro heat transfer 781 (MWX 781)

Qualification	Postgraduate
Module credits	16.00

Prerequisites	No prerequisites.
Contact time	21 contact hours per semester
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Semester 1 or Semester 2

Module content

The applications of transport processes pose new challenges in emerging areas like electronic cooling, Micro-Electro-Mechanical Systems (MEMS) and micro biological sciences. This involves devices where heat, species and fluid flows are involved within very small dimensions. Topics covered: Statistical thermodynamics, quantum mechanics, thermal properties of molecules, kinetic theory, micro/nanofluidics; thermal transport in solid micro/nanostructures, electron and phonon scattering, size effects, quantum conductance, electronic band theory, tunneling, nonequilibrium heat conduction, analysis of solid state devices such as thermoelectric refrigeration and optoelectronics; nanoscale thermal radiation and radiative properties of nanomaterials, radiation temperature and entropy, surface electromagnetic waves, near-field radiation for energy conversion devices.

Dissertation: Mining engineering 890 (MYI 890)

Qualification	Postgraduate
Module credits	180.00
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Mining Engineering
Period of presentation	Year

Thesis: Mining engineering 990 (MYI 990)

Qualification	Postgraduate
Module credits	360.00
Programmes	PhD Mining Engineering
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Mining Engineering
Period of presentation	Year

Thesis: Mining 990 (MYL 990)

Qualification	Postgraduate
Module credits	360.00
Programmes	PhD Mining

Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Mining Engineering
Period of presentation	Year

Introduction to isiNdebele Grammar - Capita selecta 110 (NDE 110)

Qualification	Undergraduate
Module credits	12.00

Programmes	BA BA Extended programme BA Languages BA Law BEd Foundation Phase Teaching BEd Intermediate Phase Teaching BEd Senior Phase and Further Education and Training Teaching BIS Publishing BPolSci Political Studies
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Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education
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Prerequisites	No prerequisites.
Contact time	2 lectures per week
Language of tuition	Module is presented in IsiNdebele
Department	African Languages
Period of presentation	Semester 1

Module content

For speakers of isiNdebele as home language or first or second additional language.

Aspects of the grammar of isiNdebele such as an introduction to the word categories; an introduction to the structure, meaning and use of the noun, the adjective, the relative, the possessive; the verb; writing and spelling rules; dictionaries and dictionary use; grammatical analysis.

isiNdebele 210 (NDE 210)

Qualification	Undergraduate
Module credits	20.00

Programmes	BA BA Languages BA Law BEd Foundation Phase Teaching BEd Intermediate Phase Teaching BEd Senior Phase and Further Education and Training Teaching BIS Publishing BPolSci Political Studies
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Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education
Prerequisites	AFT 121 and NDE 110
Contact time	2 lectures per week
Language of tuition	Module is presented in IsiNdebele
Department	African Languages
Period of presentation	Semester 1

Module content

Aspects of the grammar of isiNdebele such as a continuation of the study of the word categories; grammatical analysis; the structure, meaning and use of the pronoun and the enumerative; an introduction to isiNdebele speech sounds/phonetics.

isiNdebele 310 (NDE 310)

Qualification	Undergraduate
Module credits	30.00
Programmes	BA Law BEd Senior Phase and Further Education and Training Teaching BIS Publishing BPolSci Political Studies

Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education
Prerequisites	NDE 210, AFT 220
Contact time	2 lectures per week
Language of tuition	Module is presented in IsiNdebele
Department	African Languages
Period of presentation	Semester 1

Module content

Aspects of the grammar of isiNdebele such as a continuation of the study of the word categories; grammatical analysis; more intensive study of the structure, meaning and use of the noun (specifically derived nouns) and verb (specifically moods and verbal extensions); an introduction to the sound changes/phonology of isiNdebele.

Electrochemistry 310 (NEC 310)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Metallurgical Engineering BEng Metallurgical Engineering ENGAGE
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English

Department	Materials Science and Metallurgical Engineering
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Period of presentation	Semester 1
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Module content

Kinetics and thermodynamics of electrochemical reactions of metallurgical importance. Use of equilibrium diagrams to identify possible reactions products. Use of polarisation diagrams to describe reaction kinetics. Application of these principles to metallurgical examples, including corrosion, leaching and electrometallurgy. Influence of substrate composition, electrolyte composition, impurities, reaction products and agitation on kinetics.

Electrometallurgy 700 (NEL 700)

Qualification	Postgraduate
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Module credits	30.00
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Programmes	BEngHons Metallurgical Engineering BScHons Applied Science Metallurgy
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Prerequisites	Geen voorvereistes.
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Contact time	48 contact hours per semester
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Language of tuition	Module is presented in English
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Department	Materials Science and Metallurgical Engineering
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Period of presentation	Year
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Module content

At the end of the module, students should be able to conceptualise and design new electrometallurgical processes and improve the operation of existing processes through an understanding of the basic principles of the thermodynamics and kinetics of electrochemistry, measurement techniques used in electrochemistry, and considering the principles of electrochemical reactor design, different electrode and cell configurations, role of additives to electrolytes, role of impurities in the electrowinning process, the steps involved in electrocrystallization processes and present practices used for the electrowinning of metals such as copper, nickel, cobalt, zinc, manganese and gold.

Excursions 320 (NEX 320)

Qualification	Undergraduate
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Module credits	8.00
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Programmes	BEng Metallurgical Engineering BEng Metallurgical Engineering ENGAGE
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Prerequisites	(NMP 310)
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Language of tuition	Module is presented in English
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Department	Materials Science and Metallurgical Engineering
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Period of presentation	Semester 2
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Module content

Students attend and participate in five half-day excursions to metallurgical operations. Assessment is based on written reports and oral presentations. The excursions include visits to hydrometallurgical, pyrometallurgical, minerals processing and materials processing plants.

Fabrication engineering 700 (NFE 700)

Qualification	Postgraduate
Module credits	30.00
Programmes	BEngHons Metallurgical Engineering BEngHons Metallurgical Engineering Welding Engineering BScHons Applied Science Metallurgy BScHons Applied Science Metallurgy: Welding Technology
Prerequisites	No prerequisites.
Contact time	48 contact hours per semester
Language of tuition	Module is presented in English
Department	Materials Science and Metallurgical Engineering
Period of presentation	Semester 1 or Semester 2

Module content

This module looks at quality assurance and control in welded fabrication and manufacture, and introduces various standards and codes of manufacture used in the welding industry. Measurement, control and recording in welding, the principle of fitness for purpose, as well as health and safety issues are addressed. Control of residual stresses and distortion during welding, non-destructive testing, repair welding, and the economics of welding are considered. This module also examines plant facilities, welding jigs and fixtures. Special emphasis is placed on the design and implementation of welding procedure specifications, procedure qualification records and quality control plans. A number of case studies are examined.

Physical metallurgy 700 (NFM 700)

Qualification	Postgraduate
Module credits	30.00
Programmes	BEngHons Metallurgical Engineering BScHons Applied Science Metallurgy
Prerequisites	No prerequisites.
Contact time	48 contact hours per semester
Language of tuition	Module is presented in English
Department	Materials Science and Metallurgical Engineering
Period of presentation	Semester 1 or Semester 2

Module content

The module deals with the basic understanding of phase transformations in alloys, and its relationship with microstructure and mechanical properties of alloys. Included are transformation processes such as solidification; nucleation, growth and coarsening of precipitates; the use of carbides and intermetallic compounds in steels; static and dynamic re-crystallisation; grain growth and the use of grain boundary engineering; the martensite, bainite and pearlite transformations; thermomechanical processing and some elements of quantitative metallography. The course is practice orientated; the current best fundamental understanding of these transformation processes covered, and its role in engineering application demonstrated. The course is fully documented on CD-ROM from the latest literature and is largely intended for that research student who is embarking on a physical metallurgical research project.

Basic physical metallurgy 701 (NFM 701)

Qualification	Postgraduate
Module credits	30.00
Programmes	BScHons Applied Science Metallurgy
Prerequisites	No prerequisites.
Contact time	48 contact hours per semester
Language of tuition	Module is presented in English
Department	Materials Science and Metallurgical Engineering
Period of presentation	Semester 1 or Semester 2

Module content

This module serves as a bridge into full post graduate studies in physical and mechanical metallurgy for students who do not have a formal first degree in these subjects. The following topics are covered in this module: phases in alloys, diffusion, solidification, the precipitation of second phases in alloys and the recrystallisation and grain growth of single phase alloys, aluminium and its alloys, copper and its alloys, nickel base alloys, the iron-carbon phase diagram, the heat treatment of steels, dislocations and the deformation of metals, engineering strength of metals and alloys, creep deformation, introduction to fracture mechanics and fatigue and failure analysis. This module will, therefore, enable the student to understand the fundamentals that govern alloy design, heat treatment, physical and mechanical properties and behaviour of materials during heat treatment and under stress and will enable the correct selection of alloys for a particular use, the prescription of heat treatments and further mechanical processing of these alloys to achieve the required metallurgical and mechanical properties.

Heat treatment 700 (NHB 700)

Qualification	Postgraduate
Module credits	30.00
Programmes	BEngHons Metallurgical Engineering BScHons Applied Science Metallurgy
Prerequisites	No prerequisites.
Contact time	48 contact hours per semester

Language of tuition	Module is presented in English
Department	Materials Science and Metallurgical Engineering
Period of presentation	Semester 1 or Semester 2

Module content

The emphasis is on the practice of the heat treatment of steels, covering the following topics: introduction and fundamental aspects of the Fe-C system; alloying elements; tempering of martensite; pearlite and bainite formation, hardenability; annealing, normalizing, hardening and tempering; stress relieving, use of CCT and TTT diagrams, HSLA steels, tool steels; stainless steels, heat treatment furnaces and their atmospheres, induction hardening, carburisation, nitriding, mechanical testing, non-destructive examination and heat treatment, hydrogen embrittlement, temper embrittlement, quantitative metallography for quality control, heat treatment for fracture toughness and heat treatment case studies. The course is partly available on CD-ROM with up-to-date references to the latest literature.

Hydrometallurgy 322 (NHM 322)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Metallurgical Engineering BEng Metallurgical Engineering ENGAGE
Prerequisites	(NPT 220)
Contact time	3 lectures per week, 3 practicals per week
Language of tuition	Module is presented in English
Department	Materials Science and Metallurgical Engineering
Period of presentation	Semester 2

Module content

Merits of hydrometallurgy relative to other extraction methods. Unit processes in hydrometallurgy. Chemical principles of hydrometallurgy. Chemistry of important metals and lixiviants. Application of chemical principles to: leaching; purification and upgrading of leach solutions (precipitation, solvent extraction, ion exchange, activated carbon); product recovery from solution (precipitation, reduction). Relevant analytical methods.

Hydrometallurgy 412 (NHM 412)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Metallurgical Engineering BEng Metallurgical Engineering ENGAGE
Prerequisites	(NHM 322)
Contact time	2 tutorials per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Materials Science and Metallurgical Engineering

Period of presentation	Semester 1
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Module content

Extraction routes and the extractive metallurgy of metals such as gold, copper, zinc, manganese, nickel, cobalt, uranium and the platinum group elements, from ores and secondary sources. Application of thermodynamics and reaction kinetics (including laboratory kinetic data) in understanding and optimisation of extraction routes, and sizing of reactors. Environmental impact of processing routes.

Hydrometallurgy 700 (NHM 700)

Qualification	Postgraduate
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Module credits	30.00
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Programmes	BEngHons Metallurgical Engineering BScHons Applied Science Metallurgy
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Prerequisites	No prerequisites.
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Contact time	48 contact hours per semester
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Language of tuition	Module is presented in English
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Department	Materials Science and Metallurgical Engineering
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Period of presentation	Semester 1 or Semester 2
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Module content

The aim with this course is to enable the students to understand the design and operation of hydrometallurgical processes for the beneficiation of minerals and metals. The theoretical basis of the solution chemistry underlying hydrometallurgical processes, the purification and concentration options available, and the metal recovery processes such as precipitation, hydrogen reduction, and electrowinning are reviewed. This is then followed by the consideration of the engineering aspects and the technical application of hydrometallurgical processes for a number of ores relevant to South Africa.

Basic extractive metallurgy 701 (NHM 701)

Qualification	Postgraduate
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Module credits	30.00
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Programmes	BScHons Applied Science Metallurgy
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Prerequisites	No prerequisites.
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Contact time	48 contact hours per semester
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Language of tuition	Module is presented in English
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Department	Materials Science and Metallurgical Engineering
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Period of presentation	Semester 1 or Semester 2
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Module content

This module covers the fundamental principles of hydrometallurgy and minerals processing. In the minerals processing part of the module, students are given perspective on the scope of and functions in mineral processing, different unit operations and processing options for different deposits. Themes are comminution, classification, concentration, and solid-liquid separation. In the hydrometallurgy portion the merits and limitations of hydrometallurgy when compared with other metallurgical processes (e.g. pyrometallurgy) are considered; and different feed materials for hydrometallurgical processes; different unit processes in hydrometallurgy; fundamental thermodynamic and kinetic concepts as used in leaching; different leach reactors and their applications; solution purification and metal recovery processes; selecting a suitable flowsheet for a given feed material to produce a final metal product are discussed.

Dissertation 890 (NIN 890)

Qualification	Postgraduate
Module credits	180.00
Programmes	MEng Metallurgical Engineering
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Materials Science and Metallurgical Engineering
Period of presentation	Year

Dissertation 891 (NIN 891)

Qualification	Postgraduate
Module credits	180.00
Programmes	MSc Applied Science Metallurgy
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Materials Science and Metallurgical Engineering
Period of presentation	Year

Professional and technical communication 210 (NJJ 210)

Qualification	Undergraduate
Module credits	8.00
Programmes	BEng Metallurgical Engineering BEng Metallurgical Engineering ENGAGE
Prerequisites	No prerequisites.
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Materials Science and Metallurgical Engineering

Period of presentation	Semester 1
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Module content

Communicate effectively, both orally and in writing, with engineering audiences and the community at large. Written communication as evidenced by: uses appropriate structure, use of modern or electronic communication methods; style and language for purpose and audience; uses effective graphical support; applies methods of providing information for use by others involved in engineering activity; meets the requirements of the target audience. Effective oral communication as evidenced by appropriate structure, style and language; appropriate visual materials; delivers fluently; meets the requirements of the intended audience. Audiences range from engineering peers, management and lay persons, using appropriate academic or professional discourse. Typed reports range from short (300-1 000 word plus tables diagrams) to long (10 000-15 000 words plus tables, diagrams, references and appendices), covering material at exit level. Methods of providing information include the conventional methods of the discipline, for example engineering drawings, as well as subject-specific methods.

Corrosion 410 (NKR 410)

Qualification	Undergraduate
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Module credits	16.00
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Prerequisites	No prerequisites.
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Contact time	3 lectures per week, 3 practicals per week
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Language of tuition	Module is presented in English
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Department	Materials Science and Metallurgical Engineering
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Period of presentation	Semester 1
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Module content

Thermodynamics and kinetics of electrochemical processes relevant to corrosion. Application of electrochemical techniques in corrosion. Theory and practice of corrosion phenomena such as uniform and localised forms of corrosion including crevice and pit corrosion, dealloying, sensitisation and environmentally assisted cracking. Mitigation of corrosion through materials selection, modification of the environment, and by the application of cathodic and anodic protection, and protective coatings.

Corrosion 700 (NKR 700)

Qualification	Postgraduate
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Module credits	30.00
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Programmes	BEngHons Metallurgical Engineering BScHons Applied Science Metallurgy
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Prerequisites	No prerequisites.
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Contact time	48 contact hours per semester
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Language of tuition	Module is presented in English
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Department	Materials Science and Metallurgical Engineering
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Period of presentation	Semester 1 or Semester 2
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Module content

The aim with this course is to facilitate the development of the students in corrosion engineering by considering the electrochemical fundamentals of corrosion processes as well as their experimental and practical implications for corrosion diagnosis and control. The practical manifestations of the broad types of corrosion are reviewed and the skills of the students to utilise corrosion control methodologies such as chemical and electrochemical control, protective coatings and material selection to control corrosion are developed.

Research project 700 (NLO 700)

Qualification	Postgraduate
Module credits	30.00
Programmes	BEngHons Metallurgical Engineering BEngHons Metallurgical Engineering Welding Engineering BScHons Applied Science Metallurgy BScHons Applied Science Metallurgy: Welding Technology
Prerequisites	No prerequisites.
Contact time	48 contact hours per semester
Language of tuition	Module is presented in English
Department	Materials Science and Metallurgical Engineering
Period of presentation	Semester 1 or Semester 2

Module content

The refereed literature on a specific topic (normally related to subsequent research towards a master's degree) is studied and summarised in a written report. The important skills are finding appropriate papers, reading and comprehending these, and using the information in the paper to construct your own view on the research topic. There are no formal contact sessions. The first part of this module involves definition of a research topic (to be approved by the head of the department), development of a literature survey and compilation of a detailed research proposal. The second part of the module involves generation, presentation and critical interpretation of a project plan/results, and compilation of a written report and an oral presentation. The written document must be submitted at the end of October, with an oral presentation of 20-30 minutes in the week following submission of the survey.

Materials science 113 (NMC 113)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Civil Engineering BEng Computer Engineering BEng Electrical Engineering BEng Electronic Engineering BEng Metallurgical Engineering BEng Mining Engineering
Prerequisites	No prerequisites.
Contact time	1 practical per week, 1 tutorial per week, 4 lectures per week

Language of tuition	Module is presented in English
Department	Materials Science and Metallurgical Engineering
Period of presentation	Semester 1

Module content

Introduction to materials: the family of materials, atomic structure and types of bonding, crystal types and space arrangement of atoms, directions and planes in crystals, defects in crystals, diffusion in solids. Mechanical properties of materials: stress and strain, mechanical testing (strength, ductility, hardness, toughness, fatigue, creep), plastic deformation, solid-solution hardening, recrystallisation.

Polymeric materials: polymerisation and industrial methods, types of polymeric materials and their properties.

Corrosion of metals: mechanisms and types of corrosion, corrosion rates, corrosion control. The heat treatment of steel: Fe-C phase diagram, equilibrium cooling, hardening and tempering of steel, stainless steel. Composite materials: Introduction, fibre reinforced polymeric composites, concrete, asphalt, wood.

Materials science 123 (NMC 123)

Qualification	Undergraduate
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Module credits	16.00
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Programmes	BEng Civil Engineering ENGAGE
	BEng Computer Engineering ENGAGE
	BEng Electrical Engineering ENGAGE
	BEng Electronic Engineering ENGAGE
	BEng Industrial Engineering
	BEng Industrial Engineering ENGAGE
	BEng Mechanical Engineering
	BEng Mechanical Engineering ENGAGE
	BEng Metallurgical Engineering ENGAGE
	BEng Mining Engineering ENGAGE

Prerequisites	No prerequisites.
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Contact time	1 practical per week, 1 tutorial per week, 4 lectures per week
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Language of tuition	Module is presented in English
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Department	Materials Science and Metallurgical Engineering
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Period of presentation	Semester 2
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Module content

Introduction to materials: the family of materials, atomic structure and types of bonding, crystal types and space arrangement of atoms, directions and planes in crystals, defects in crystals, diffusion in solids. Mechanical properties of materials: stress and strain, mechanical testing (strength, ductility, hardness, toughness, fatigue, creep), plastic deformation, solid-solution hardening, recrystallisation.

Polymeric materials: polymerisation and industrial methods, types of polymeric materials and their properties.

Corrosion of metals: mechanisms and types of corrosion, corrosion rates, corrosion control. The heat treatment of steel: Fe-C phase diagram, equilibrium cooling, hardening and tempering of steel, stainless steel. Composite materials: Introduction, fibre reinforced polymeric composites, concrete, asphalt, wood.

Materials science 223 (NMC 223)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Metallurgical Engineering BEng Metallurgical Engineering ENGAGE
Prerequisites	NMC 113 or NMC 123
Contact time	2 practicals per week, 4 lectures per week
Language of tuition	Module is presented in English
Department	Materials Science and Metallurgical Engineering
Period of presentation	Semester 2

Module content

Phase diagrams, phases and solid solutions. The heat treatment of steel (phase equilibria, the diffusion-controlled and martensitic transformations of austenite, hardening and tempering, hardenability, the application of IT and CCT diagrams, heat treatments). Steel types and classification. Cast irons (white, grey, malleable and spherical graphite irons). Stainless steels (ferritic, martensitic, austenitic and duplex types).

Materials science 313 (NMC 313)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Metallurgical Engineering BEng Metallurgical Engineering ENGAGE
Prerequisites	(NMC 223)
Contact time	3 lectures per week, 3 practicals per week
Language of tuition	Module is presented in English
Department	Materials Science and Metallurgical Engineering
Period of presentation	Semester 1

Module content

Binary and ternary phase diagrams. Diffusion in alloys (steady-state and nonsteady-state, solid solutions, grain boundaries, homogenisation). Solidification (pure metals and alloys; ingots, castings and welds; segregation, porosity and eutectic solidification). Metallographic and analytical techniques (diffraction, electron microscopy). Precipitation and solid-solution strengthening (principles, and applications to aluminium, magnesium, copper and nickel-base alloys).

Mechanical metallurgy 320 (NMM 320)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Metallurgical Engineering BEng Metallurgical Engineering ENGAGE

Prerequisites	(NMC 223)
Contact time	3 lectures per week, 4 practicals per week
Language of tuition	Module is presented in English
Department	Materials Science and Metallurgical Engineering
Period of presentation	Semester 2

Module content

Dislocations and deformation (defects in crystalline materials, movement and elastic energy of dislocations, different crystal lattices, origin of and strengthening by dislocations). Strength of engineering materials (tensile testing, plastic deformation of single crystals and polycrystalline materials, hardness, residual stress). Creep deformation (primary and secondary creep, stress and temperature dependence, creep rupture). Introduction to fracture mechanics (Griffith criterion, stress intensity, fracture toughness, fatigue). Failure analysis. Hot and cold rolling of metals.

Mechanical metallurgy 700 (NMM 700)

Qualification	Postgraduate
Module credits	30.00
Programmes	BEngHons Metallurgical Engineering BScHons Applied Science Metallurgy
Prerequisites	No prerequisites.
Contact time	48 contact hours per semester
Language of tuition	Module is presented in English
Department	Materials Science and Metallurgical Engineering
Period of presentation	Semester 1 or Semester 2

Module content

We cover the interaction between the internal structure of metals – on the atomic and microscopic scales – and their mechanical properties. Practically important topics such as elastic and plastic stress analysis, dislocations and deformation, room and high temperature deformation processes, mechanical property/microstructure relationships for low and medium Carbon steels and for micro-alloyed and HSLA steels, fatigue processes, stress corrosion cracking, creep deformation processes and fracture mechanics are covered in depth, and illustrated with case studies. The course is largely available on CD-ROM with references to the latest literature.

Minerals processing 310 (NMP 310)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Metallurgical Engineering BEng Metallurgical Engineering ENGAGE BEng Mining Engineering BEng Mining Engineering ENGAGE
Prerequisites	No prerequisites.

Contact time	3 lectures per week, 4 practicals per week
Language of tuition	Module is presented in English
Department	Materials Science and Metallurgical Engineering
Period of presentation	Semester 1

Module content

Minerals processing in perspective (economic importance, economic nature of mineral deposits, mineral properties and analysis, mineral processing functions). Liberation analysis (importance and measurement of liberation; particle size analysis). Comminution (theories and principles, crushers, grinding mills). Screening and classification (industrial screening, cyclones). Concentration processes (gravity concentration, dense medium concentration). Froth flotation.

Minerals processing 411 (NMP 411)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Metallurgical Engineering BEng Metallurgical Engineering ENGAGE
Prerequisites	(NMP 310)
Contact time	1 tutorial per week, 2 practicals per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Materials Science and Metallurgical Engineering
Period of presentation	Semester 1

Module content

The sizing, application and efficiency determination of the most commonly used unit operations covering crushing, screening, classification, milling, gravity concentration, dense medium separation, magnetic separation and thickening.

Minerals processing 700 (NMP 700)

Qualification	Postgraduate
Module credits	30.00
Programmes	BEngHons Metallurgical Engineering BScHons Applied Science Metallurgy
Prerequisites	No prerequisites.
Contact time	48 contact hours per semester
Language of tuition	Module is presented in English
Department	Materials Science and Metallurgical Engineering
Period of presentation	Semester 1 or Semester 2

Module content

Principles and advanced theory of comminution, classification and density separation are covered.

Applied theory of sampling for minerals processing 701 (NMP 701)

Qualification Postgraduate

Module credits 30.00

Programmes [BEngHons Metallurgical Engineering](#)
[BScHons Applied Science Metallurgy](#)

Prerequisites No prerequisites.

Contact time 48 contact hours per semester

Language of tuition Module is presented in English

Department Materials Science and Metallurgical Engineering

Period of presentation Semester 1 or Semester 2

Module content

This module covers both the theory and practice of sampling, primarily with respect to the minerals processing industry. As sampling is statistical in nature, basic statistics relevant to sampling theory will be considered. The module will then focus on the theory of sampling with specific reference to managing large and small scale variability. The effect of interpolation errors, periodic errors and increment weighting errors will be considered under large scale variability. Under small scale variability the determination and management of various errors that result in small scale variability will be covered, as well as the compilation of sampling protocols that can minimise these errors. The module will also examine the evaluation of dry and wet sampling equipment with respect to the different bias generators, as well as the implementation of sampling protocols in practice. Ore types covered during the course include coal, iron ore, gold and platinum.

Research methodology 320 (NNM 320)

Qualification Undergraduate

Module credits 6.00

Prerequisites No prerequisites.

Language of tuition Separate classes for Afrikaans and English

Department Construction Economics

Period of presentation Semester 2

Module content

Introduction to scientific research. Planning and preparation of a research project. Different research methods.

Research methodology 710 (NNM 710)

Qualification Postgraduate

Module credits 4.00

Programmes	BScHons Construction Management BScHons Quantity Surveying BScHons Real Estate
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Prerequisites	No prerequisites.
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Contact time	2 lectures per week
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Language of tuition	Module is presented in English
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Department	Construction Economics
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Period of presentation	Semester 1
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Module content

Introduction to scientific research. Planning and preparation of a research proposal with implementation of research methodologies.

Research methodology 820 (NNM 820)

Qualification	Postgraduate
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Module credits	10.00
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Programmes	MSc Real Estate Retail Property (Coursework) MSc Real Estate (Coursework)
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Prerequisites	No prerequisites.
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Contact time	10 lectures per week
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Language of tuition	Module is presented in English
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Department	Construction Economics
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Period of presentation	Semester 2
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Nuclear reactor materials 700 (NNR 700)

Qualification	Postgraduate
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Module credits	30.00
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Prerequisites	No prerequisites.
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Contact time	10 lectures per week
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Language of tuition	Module is presented in English
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Department	Materials Science and Metallurgical Engineering
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Period of presentation	Semester 1 or Semester 2
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Module content

In this module the mechanical behaviour of metals and alloys at room and high temperature is addressed but with special emphasis on nuclear materials used in commercial power reactors. In particular these materials' behaviour under deformation, creep, fracture, fatigue and also corrosion in irradiation conditions for in-core materials as well as their behaviour under the unique environmental conditions for out-of-core materials is covered.

Process design 421 (NOP 421)

Qualification	Undergraduate
Module credits	32.00
Programmes	BEng Metallurgical Engineering BEng Metallurgical Engineering ENGAGE
Prerequisites	(NMP 411), finalists only.
Contact time	1 lecture per week, 1 tutorial per week
Language of tuition	Module is presented in English
Department	Materials Science and Metallurgical Engineering
Period of presentation	Semester 2

Module content

Philosophy of design and the design process; phases of plant design and their interrelationships. Principles of project planning and management. Unit and process design, simulation, economic evaluation and optimising as applicable to the metallurgical industry. Execution of a process design project, submission of a report, oral presentations and construction of a scale model.

Metallurgical analysis 700 (NPA 700)

Qualification	Postgraduate
Module credits	16.00
Programmes	BEngHons Metallurgical Engineering
Prerequisites	No prerequisites.
Contact time	24 Hours
Language of tuition	Module is presented in English
Department	Materials Science and Metallurgical Engineering
Period of presentation	Semester 1 or Semester 2

Module content

The aim is to solve metallurgical problems with the aid of hi-tech analytical techniques. These different analytical techniques are given in modular form and the respective metallurgical area of specialisation will dictate the combination of three techniques to suit the requirements of the research student. Specialisation areas like Physical Metallurgy, Welding Metallurgy, Hydro Metallurgy, Pyro Metallurgy and Minerals Processing are covered and any other combination can be requested by the study leaders after consultation with the course leader. The techniques included are TEM, SEM, Auger Spectroscopy (AES), X-ray Photo-electron Spectroscopy (XPS), Glow Discharge Optical emission Spectroscopy (GDOES), X-ray Diffraction (XRD), X-ray fluorescence (XRF), Gleeble hot working simulations and Dilatometry. Lectures cover the theory of these techniques in depth and the theory is illustrated with industrial case studies.

Process heat transfer and control 312 (NPB 312)

Qualification	Undergraduate
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Module credits	16.00
Programmes	BEng Metallurgical Engineering BEng Metallurgical Engineering ENGAGE
Prerequisites	No prerequisites.
Contact time	1 tutorial per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Materials Science and Metallurgical Engineering
Period of presentation	Semester 1

Module content

Elements of metallurgical process control. Introduction to process instrumentation. Control loops, identification of controlled and manipulated variables and disturbances. Principles of proportional integral controller, tuning of PID controllers. Principles of steady-state and transient heat transfer. Transient and steady-state heat transfer in metallurgy (formation of freeze layers, heating and cooling of components). Introduction to the numerical solution to steady-state and transient heat transfer problems.

Process metallurgy and control 412 (NPB 412)

Qualification	Undergraduate
Module credits	8.00
Programmes	BEng Metallurgical Engineering BEng Metallurgical Engineering ENGAGE
Prerequisites	(NPM 321)
Language of tuition	Module is presented in English
Department	Materials Science and Metallurgical Engineering
Period of presentation	Semester 1

Module content

Elements of metallurgical process control (principles, selection of proportional-integral controller, identification of controlled and manipulated variables and disturbances). Transient and steady-state heat transfer in metallurgy (formation of freeze layers, heating and cooling of components). Principles of reaction kinetics in pyrometallurgy (types and identification of rate-determining steps, quantification of overall reaction rate).

Pyrometallurgy 321 (NPM 321)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Metallurgical Engineering BEng Metallurgical Engineering ENGAGE
Prerequisites	NPT 220
Contact time	2 tutorials per week, 3 lectures per week

Language of tuition	Module is presented in English
Department	Materials Science and Metallurgical Engineering
Period of presentation	Semester 2

Module content

Overview of pyrometallurgical process routes, types of reactions, and reactor designs. Review of relevant thermodynamic principles (equilibrium constants, Henrian and Raoultian activities and activity coefficients). Slag basicity and viscosity. Energy and reductants. Overview of pyrometallurgical separation principles (vapour-phase, solid-state and liquid-liquid routes). Examples of pyrometallurgical separation processes (ironmaking and steelmaking, sulphide smelting and converting, ferroalloys).

Pyrometallurgy 700 (NPM 700)

Qualification	Postgraduate
Module credits	30.00
Programmes	BEngHons Metallurgical Engineering BScHons Applied Science Metallurgy
Prerequisites	No prerequisites.

Contact time 48 contact hours per semester

Language of tuition	Module is presented in English
Department	Materials Science and Metallurgical Engineering
Period of presentation	Semester 1 or Semester 2

Module content

We aim to provide you with practice in using fundamental principles to analyse pyrometallurgical processes – to be able to go from understanding to process improvement. To this end, the necessary fundamentals of reaction equilibria (including activity descriptions), reaction kinetics, and mass and energy balances are reviewed. Practical examples illustrate the use of these principles. In the final block, we analyse a number of practical processes in more detail. Throughout, the emphasis is on quantification.

Basic pyrometallurgy 701 (NPM 701)

Qualification	Postgraduate
Module credits	30.00
Programmes	BScHons Applied Science Metallurgy
Prerequisites	No prerequisites.

Contact time 48 contact hours per semester

Language of tuition	Module is presented in English
Department	Materials Science and Metallurgical Engineering
Period of presentation	Semester 1 or Semester 2

Module content

In this module you will develop the skills required to analyse the equilibria of pyrometallurgical processes. Solving such a problem requires skills in thermodynamic analysis, and knowledge of the typical processes (and the conditions within these processes) which are used to extract and refine metals like iron (steel), copper, titanium, chromium, manganese, and aluminium. The aim is to enable you to analyse a current or proposed process with regards to feasibility, and to propose processing conditions (e.g. temperature, slag composition) which will achieve the required equilibrium state. This also applies to refractory systems, where the primary aim will be to evaluate whether a given refractory material is suitable for a given application, or the impact of certain impurities on the refractory material.

Process thermodynamics 220 (NPT 220)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Metallurgical Engineering BEng Metallurgical Engineering ENGAGE
Prerequisites	(NTC 210)
Contact time	2 tutorials per week, 4 lectures per week
Language of tuition	Module is presented in English
Department	Materials Science and Metallurgical Engineering
Period of presentation	Semester 2

Module content

The first, second and third laws of thermodynamics, enthalpy and heat capacity. The criteria for equilibrium, Gibbs free energy, chemical potential, partial molar Gibbs free energy, activity, activity coefficient and the equilibrium constant. Solution thermodynamics of ideal and non-ideal solutions, as well as solution models. Ellingham, Kellogg and Pourbaix diagrams. The thermodynamic principles are applied to metallurgical processes. Applications also include stoichiometry and mass balance problems, as well as the calculation of energy balances.

Metals processing and welding 410 (NPW 410)

Qualification	Undergraduate
Module credits	16.00
Prerequisites	(NMC 312) and (NMM 320)
Contact time	2 practicals per week, 4 lectures per week
Language of tuition	Module is presented in English
Department	Materials Science and Metallurgical Engineering
Period of presentation	Semester 1

Module content

Liquid metal processing. Sheet metal processing. Welding processes. Surface processing and hard facing. Processing for fatigue resistance; fatigue of welded structures. Soldering and brazing. Metallurgy of welding and the heat-affected zone. Welding of carbon steels, cast irons and non-ferrous alloys. Metallurgy and welding of stainless steels. Welding codes, specifications, quality assurance.

Metals processing 411 (NPW 411)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Metallurgical Engineering BEng Metallurgical Engineering ENGAGE
Prerequisites	(NMC 313), (NMM 320)
Contact time	2 practicals per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Materials Science and Metallurgical Engineering
Period of presentation	Semester 1

Module content

Introduction to welding and joining processes. Welding of carbon steels, stainless steels, aluminium and aluminium alloys. Development and qualification of welding procedure specifications. Liquid metal processing (casting processes, solidification of castings and mould design). Deformation processing (forging, extrusion and rolling), sheet metal processing and surface processing. The identification and prevention of defects.

Industrial training 316 (NPY 316)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Metallurgical Engineering BEng Metallurgical Engineering ENGAGE
Prerequisites	No prerequisites.
Contact time	1 other contact session per week
Language of tuition	Module is presented in English
Department	Materials Science and Metallurgical Engineering
Period of presentation	Semester 1

Module content

*Attendance module only

During or at the end of the second year of study, students in Metallurgical Engineering undergo at least six weeks of prescribed training in industry. A satisfactory report on the practical training must be submitted to the Faculty Administration within one week of registration. In exceptional circumstances the prescribed minimum period can be reduced, as approved by the Dean.

Industrial training 416 (NPY 416)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Metallurgical Engineering BEng Metallurgical Engineering ENGAGE
Prerequisites	No prerequisites.
Contact time	1 other contact session per week
Language of tuition	Module is presented in English
Department	Materials Science and Metallurgical Engineering
Period of presentation	Semester 1 or Semester 2

Module content

*Attendance module only

During or at the end of the third year of study, students in Metallurgical Engineering undergo at least six weeks of prescribed training in the industry. A satisfactory report on the practical training must be submitted to the department within one week of registration. In exceptional circumstances the prescribed minimum period can be reduced, as approved by the Chairman of the School of Engineering.

Literature survey and research planning 412 (NSC 412)

Qualification	Undergraduate
Module credits	8.00
Programmes	BEng Metallurgical Engineering BEng Metallurgical Engineering ENGAGE
Prerequisites	(NHM 322) or (NMM 320) or (NPM 321) or (NVM 321), finalists only.
Contact time	1 tutorial per week
Language of tuition	Module is presented in English
Department	Materials Science and Metallurgical Engineering
Period of presentation	Semester 1

Module content

Literature search (using electronic databases of publications, formulating search strategies). Hypothesis formulation and preliminary experimental planning (identifying research question and stating hypothesis, proposing critical experiments, evaluating feasibility of possible experimental approaches). Literature survey (critical evaluation of published information, synthesising available information into a coherent argument, written and oral reporting). Final experimental planning (formulation of experiments with attention to calibration, uncertainty, reliability and safety).

Project 422 (NSC 422)

Qualification	Undergraduate
Module credits	32.00

Programmes	BEng Metallurgical Engineering BEng Metallurgical Engineering ENGAGE
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Prerequisites	NSC 411 or NSC 412
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Contact time	1 tutorial per week
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Language of tuition	Module is presented in English
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Department	Materials Science and Metallurgical Engineering
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Period of presentation	Semester 2
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Module content

Execution of a research project: experimentation (with attention to safety, reliability, calibration and reproducibility); analysis of results to yield data (with statistical analysis of uncertainty); interpretation of data (to test the stated hypothesis); written reporting of results (with updated literature survey, description of experimental approach, data obtained, conclusions, and scientific and industrial implications); oral and poster presentations.

Froth flotation 700 (NSF 700)

Qualification	Postgraduate
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Module credits	30.00
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Programmes	BScHons Applied Science Metallurgy
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Prerequisites	No prerequisites.
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Contact time	48 contact hours per semester
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Language of tuition	Module is presented in English
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Department	Materials Science and Metallurgical Engineering
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Period of presentation	Semester 1 or Semester 2
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Module content

Fundamentals of sulphide and coal flotation are covered, including the chemistry of sulphide mineral flotation; natural and induced hydrophobicity; physical and chemical interactions in coal flotation; review of sulphydryl and oxydryl collectors and their absorption mechanisms; the role of activators/depressants and pH regulators as well as an investigation of frothers and froth stability, with reference to recent industrial developments. Aspects of flotation practice are addressed: Experimental methods for laboratory and plant trials; basic and complex flotation circuits with examples from recent developments; control in flotation plants: reagents/conditioning. Finally, relevant interfacial surface chemistry is covered: the role of water in flotation; mechanisms and thermodynamics of collector activity.

Welding metallurgy 700 (NSW 700)

Qualification	Postgraduate
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Module credits	30.00
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Programmes	BEngHons Metallurgical Engineering BEngHons Metallurgical Engineering Welding Engineering BScHons Applied Science Metallurgy BScHons Applied Science Metallurgy: Welding Technology
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Prerequisites	No prerequisites.
Contact time	48 contact hours per semester
Language of tuition	Module is presented in English
Department	Materials Science and Metallurgical Engineering
Period of presentation	Semester 1 or Semester 2

Module content

This module examines the basic physical metallurgy and heat treatment of various metals and alloys, and the application of various mechanical testing techniques, microstructural analysis and corrosion testing to characterise metals and alloys. The structure and properties of welds in carbon steels, stainless steels, cast irons, copper and copper alloys, nickel and nickel alloys, aluminium and aluminium alloys and other materials (Ti, Mg, Ta and Zr) are discussed. Defects are discussed and various techniques to avoid the formation of these defects in welds are considered.

Metallurgical calculations 210 (NTC 210)

Qualification	Undergraduate
Module credits	8.00
Programmes	BEng Metallurgical Engineering BEng Metallurgical Engineering ENGAGE
Prerequisites	(CHM 171) or (CHM 172).
Contact time	2 lectures per week, 3 discussion classes per week
Language of tuition	Module is presented in English
Department	Materials Science and Metallurgical Engineering
Period of presentation	Semester 1

Module content

The content relates to metallurgical calculations: dimensions, units and their conversion. The mol unit, density, concentration. Specific volume, bulk density, the density of ideal mixtures. Empirical formulae, chemical reaction and stoichiometry, excess reactant, conversion yield, selectivity. Gas laws. Material balances where gases are involved. Fuels and combustion. Introduction to material balances: a strategy for solving problems. Material balances. Basic electrochemistry.

Metallurgical fluid mechanics 310 (NTV 310)

Qualification	Undergraduate
Module credits	8.00
Programmes	BEng Metallurgical Engineering BEng Metallurgical Engineering ENGAGE

Prerequisites	No prerequisites.
Contact time	1 practical per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Mechanical and Aeronautical Engineering
Period of presentation	Quarter 1

Module content

Introduction: Liquids and gases, pressure, viscosity, temperature. Fluid statics and pressure measurement. Introduction to control volume method for mass, momentum and energy conservation. Bernoulli equation. Flow in pipes and channels: friction coefficients and Reynolds number, pressure drop; laminar, turbulent and transitional flow.

Refractory materials 321 (NVM 321)

Qualification	Undergraduate
Module credits	8.00
Programmes	BEng Metallurgical Engineering BEng Metallurgical Engineering ENGAGE
Prerequisites	(NPT 220) and NPM 321 #
Contact time	1 tutorial per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Materials Science and Metallurgical Engineering
Period of presentation	Semester 2

Module content

Classification, requirements and properties of refractory materials. Manufacturing principles. Specification and testing of refractory materials. The main refractory systems, i.e silica, aluminosilicates, alumina, magnesia, magnesia-chrome, magnesia-carbon, doloma, zircon, zirconia, silicon carbide and graphite, and their applications. Principles of ternary phase diagrams and their application in refractory systems, and interactions between slag, metal and refractory materials.

Refractory materials 700 (NVM 700)

Qualification	Postgraduate
Module credits	30.00
Programmes	BEngHons Metallurgical Engineering BScHons Applied Science Metallurgy
Prerequisites	No prerequisites.
Contact time	48 contact hours per semester
Language of tuition	Module is presented in English
Department	Materials Science and Metallurgical Engineering

Period of presentation	Semester 1 or Semester 2
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Module content

The objective is to convey a fundamental understanding of the principles that are involved in the manufacture, selection and use of refractories. Relevant thermodynamic principles are reviewed, with emphasis on the thermodynamic properties of oxide materials, metals and slags, and how these affect refractory performance. Phase diagram use in refractory selection and prediction of slag-metal-refractory interactions is covered. A section on manufacture covers the types of raw materials, design and formulation, handling, manufacturing routes, and quality control (including practical mineralogy). Finally, design properties of refractories for the ferrous, cement, aluminium, copper, platinum and ferro-alloy industries are reviewed.

Mathematical modelling of metallurgical processes and materials 780 (NWM 780)

Qualification	Postgraduate
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Module credits	30.00
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Prerequisites	No prerequisites.
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Contact time	48 Contact hours
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Language of tuition	Module is presented in English
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Department	Materials Science and Metallurgical Engineering
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Period of presentation	Semester 1 or Semester 2
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Module content

This module covers both the theory and practice of mathematical modelling applied to metallurgical processes and materials. The module applies the theory mastered in prior learning such as mathematics, physics, thermodynamics, fluid mechanics, heat transfer, etc. to create mathematical representations of processes and materials. A range of modelling techniques is addressed in the module, such as solution models of solid and liquid mixtures, mass and energy balances, steady state process models, dynamic process models, heat transfer models, computational fluid dynamics models, multiphysics models and technical-economic models. The created models are then applied to solve problems encountered in research and industry.

Welding processes 700 (NWP 700)

Qualification	Postgraduate
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Module credits	30.00
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Programmes	BEngHons Metallurgical Engineering BEngHons Metallurgical Engineering Welding Engineering BScHons Applied Science Metallurgy BScHons Applied Science Metallurgy: Welding Technology
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Prerequisites	No prerequisites.
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Contact time	48 contact hours per semester
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Language of tuition	Module is presented in English
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Department	Materials Science and Metallurgical Engineering
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Period of presentation	Semester 1 or Semester 2
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Module content

This module examines arc physics, electrotechnics as applied to weld power sources, and power source design. The fundamental principles, applications, consumables and process variables of various arc welding processes, oxy-gas welding techniques, resistance welding processes, power beam processes and solid-state welding techniques are considered. Brazing and soldering, cutting, surfacing and metal spraying techniques are discussed. The module also looks at the welding of plastics, ceramics and composites, and at the mechanisation and use of robotics in the welding and joining industries. Practical training is included in this module.

Design of welded structures 701 (NWP 701)

Qualification	Postgraduate
Module credits	30.00
Programmes	BEngHons Metallurgical Engineering BEngHons Metallurgical Engineering Welding Engineering BScHons Applied Science Metallurgy BScHons Applied Science Metallurgy: Welding Technology
Prerequisites	No prerequisites.
Contact time	48 contact hours per semester
Language of tuition	Module is presented in English
Department	Materials Science and Metallurgical Engineering
Period of presentation	Semester 1 or Semester 2

Module content

This module examines welded joint design, the basics of weld design and the role of fracture mechanics in joint design. The behaviour of welded structures under different types of loading are considered, with special focus on the design of welded structures with predominantly static loading and the design of dynamically loaded welded structures. The design of welded pressure equipment, aluminium alloy structures and reinforcing-steel welded joints is considered.

Business management 114 (OBS 114)

Qualification	Undergraduate
Module credits	10.00

Programmes

BCom
BCom Accounting Sciences
BCom Agribusiness Management
BCom Business Management
BCom Econometrics
BCom Economics
BCom Financial Sciences
BCom Human Resource Management
BCom Informatics Information Systems
BCom Investment Management
BCom Law
BCom Marketing Management
BCom Statistics
BCom Statistics and Data Science
BCom Supply Chain Management
BConSci Clothing Retail Management
BConSci Food Retail Management
BConSci Hospitality Management
BEd Senior Phase and Further Education and Training Teaching
BIS Information Science
BIT Information Systems
BSW
BSc Applied Mathematics
BSc Geoinformatics
BSc Information and Knowledge Systems
BSc Mathematics
BSocSci Heritage and Cultural Tourism
BSocSci Industrial Sociology and Labour Studies

Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Humanities Faculty of Natural and Agricultural Sciences
Prerequisites	May not be included in the same curriculum as OBS 155
Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	Business Management
Period of presentation	Semester 1

Module content

The entrepreneurial mind-set; managers and managing; values, attitudes, emotions, and culture: the manager as a person; ethics and social responsibility; decision making; leadership and responsible leadership; effective groups and teams; managing organizational structure and culture inclusive of the different functions of a generic organisation and how they interact (marketing; finance; operations; human resources and general management); contextualising Sustainable Development Goals (SDG) in each of the topics.

Business management 124 (OBS 124)

Qualification Undergraduate

Module credits	10.00
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[BCom](#)
[BCom Agribusiness Management](#)
[BCom Business Management](#)
[BCom Economics](#)
[BCom Financial Sciences](#)
[BCom Human Resource Management](#)
[BCom Informatics Information Systems](#)
[BCom Law](#)
[BCom Marketing Management](#)
[BCom Statistics](#)

Programmes

[BCom Statistics and Data Science](#)
[BCom Supply Chain Management](#)
[BConSci Clothing Retail Management](#)
[BConSci Food Retail Management](#)
[BConSci Hospitality Management](#)
[BEd Senior Phase and Further Education and Training Teaching](#)
[BIS Information Science](#)
[BIT Information Systems](#)
[BSW](#)
[BSc Geoinformatics](#)
[BSc Information and Knowledge Systems](#)
[BSocSci Heritage and Cultural Tourism](#)
[BSocSci Industrial Sociology and Labour Studies](#)

Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Humanities Faculty of Natural and Agricultural Sciences
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Prerequisites	Admission to the examination in OBS 114
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Contact time	3 lectures per week
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Language of tuition	Module is presented in English
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Department	Business Management
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Period of presentation	Semester 2
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Module content

Value chain management: functional strategies for competitive advantage; human resource management; managing diverse employees in a multicultural environment; motivation and performance; using advanced information technology to increase performance; production and operations management; financial management; corporate entrepreneurship.

Business management 210 (OBS 210)

Qualification	Undergraduate
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Module credits	16.00
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Programmes	BCom
	BCom Agribusiness Management
	BCom Business Management
	BCom Human Resource Management
	BCom Informatics Information Systems
	BCom Law
	BCom Supply Chain Management
	BConSci Clothing Retail Management
	BConSci Food Retail Management
	BConSci Hospitality Management
	BEd Senior Phase and Further Education and Training Teaching
	BIS Information Science
	BIT Information Systems
	BSc Information and Knowledge Systems

Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Natural and Agricultural Sciences
Prerequisites	OBS 114 or 124 with admission to the examination in the other
Language of tuition	Module is presented in English
Department	Business Management
Period of presentation	Semester 1

Module content

Logistics management
 The role of logistics in an enterprise; definition and scope of customer service; electronic and other logistics information systems; inventory management; materials management with special reference to Japanese systems; management of the supply chain. Methods of transport and transport costs; types and costs of warehousing; electronic aids in materials handling; cost and price determination of purchases; organising for logistics management; methods for improving logistics performance.

Design thinking and business innovation 211 (OBS 211)

Qualification	Undergraduate
Module credits	16.00
Programmes	BIT Information Systems
Prerequisites	OBS 114 or 124 with admission to the examination in the other.
Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	Business Management
Period of presentation	Semester 1

Module content

Creativity, innovation and identification of opportunities: the role of creativity; techniques to facilitate creativity; barriers to creativity; creative versus critical thinking within the broad business managerial context. Creative problem solving and identification of opportunities: identification of opportunities; development of ideas; evaluation and prioritising of ideas, ideation and design thinking. Creativity and its role in design thinking towards facilitating business innovation. Design thinking techniques are applied with an emphasis on customer empathy. Business innovation is translated from the process of design thinking into incremental or disruptive new products, services and or processes. A clear understanding is created with regards to the following elements in business innovation: types and forms; technology waves; models; processes and sources. The management of innovation is also an integral part of the module.

Business creation 212 (OBS 212)

Qualification	Undergraduate
Module credits	10.00
Programmes	BIT Information Systems
Prerequisites	OBS 213
Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	Business Management
Period of presentation	Semester 2

Module content

Creating a new product, service or process to market. Comprehensive prototype feasibility and business modelling. Designing business models aligned with the market realm. Value-to-customer building and business efficiency development. Translation of business models into bankable business plans.

Responsible management 214 (OBS 214)

Qualification	Undergraduate
Module credits	10.00
Programmes	BIT Information Systems
Prerequisites	No prerequisites.
Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	Business Management
Period of presentation	Semester 1

Module content

Business ethics; sustainability and the economic system; key social challenges; key environmental challenges; key economic challenges; conventional vs. progressive measure of progress; short-term vs long-term orientation; development as an outcome of growth; sustainable development as opposed to conventional development; sustainable development goals; sustainable development goals and the changing role of business in society; implications for the notion of corporate citizenship; global responses and solutions; local responses and solutions.

Business management 220 (OBS 220)

Qualification	Undergraduate
Module credits	16.00
Programmes	BCom BCom Agribusiness Management BCom Business Management BCom Human Resource Management BCom Informatics Information Systems BCom Law BCom Marketing Management BCom Supply Chain Management BConSci Clothing Retail Management BConSci Hospitality Management BEd Senior Phase and Further Education and Training Teaching BIS Information Science BIT Information Systems BSc Information and Knowledge Systems
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Natural and Agricultural Sciences
Prerequisites	OBS 114 or 124 with admission to the examination in the other. Students from other Faculties are required to have 50% for Mathematics in Grade 12.
Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	Business Management
Period of presentation	Semester 2

Module content

Project management and negotiations:
Introduction Project management concepts; needs identification; the project, the project manager and the project team; types of project organisations; project communication and documentation. Planning and control: planning, scheduling and schedule control of projects; resource considerations and allocations; cost planning and performance evaluation.
Negotiation and collective bargaining: The nature of negotiation; preparation for negotiation; negotiating for purposes of climate creation; persuasive communication; handling conflict and aggression; specialised negotiation and collective bargaining in the South African context.

Business management 310 (OBS 310)

Qualification	Undergraduate
Module credits	20.00
Programmes	BCom BCom Business Management BCom Human Resource Management BCom Informatics Information Systems BCom Law BCom Supply Chain Management BIT Information Systems BSc Information and Knowledge Systems
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	OBS 114 or 124 with admission to the examination in the other
Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	Business Management
Period of presentation	Semester 1

Module content

Strategy formulation: the deliberate strategy process of formulating a vision and mission statement, conducting internal and external environmental analyses and selecting appropriate strategies. It will enhance an understanding of the level of strategy formulation, gaining competitive advantage in your market place and thinking strategically.

Business management 320 (OBS 320)

Qualification	Undergraduate
Module credits	20.00
Programmes	BCom BCom Informatics Information Systems BCom Law BCom Marketing Management BCom Supply Chain Management BSc Information and Knowledge Systems
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education
Prerequisites	OBS 114 or 124 with admission to the examination in the other
Language of tuition	Module is presented in English
Department	Business Management
Period of presentation	Semester 2

Module content

Strategy execution: Strategic management implementation. The role of management in strategy implementation; budgets as instrument in the implementation process; leading processes of change within enterprises; supporting policies, procedures and information systems for implementation in the various functional areas; evaluation and control of implementation. South African case studies to create contextual relevance.

Business management 330 (OBS 330)

Qualification	Undergraduate
Module credits	20.00
Programmes	BIT Information Systems
Prerequisites	No prerequisites.
Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	Business Management
Period of presentation	Semester 2

Module content

Strategy execution: The role of management in strategy implementation; budgets as instrument in the implementation process; leading processes of change within enterprises; supporting policies, procedures and information systems for implementation in the various functional areas; evaluation and control of implementation. South African case studies to create contextual relevance.

International business management 359 (OBS 359)

Qualification	Undergraduate
Module credits	20.00
Programmes	BCom Business Management BCom Marketing Management BCom Supply Chain Management BIT Information Systems BSc Information and Knowledge Systems
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	OBS 114 or OBS 124 with admission to the examination in the other
Contact time	2 lectures per week
Language of tuition	Separate classes for Afrikaans and English
Department	Business Management
Period of presentation	Semester 1

Module content

Introduction to international management

International business management; the process of internationalisation; growth in international trade and investment; the evolution of multinational enterprises; management perspectives on international trade and international trade theories; international trade regulation; economic integration; the formation of trading blocks, and free-trade areas.

The international business environment

The cultural environment of international business; the political and legal environments as well as the economic environment of international business; the international monetary system; the foreign exchange market; and international capital markets.

International business management 369 (OBS 369)

Qualification	Undergraduate
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Module credits	20.00
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Programmes	BCom Supply Chain Management BSc Information and Knowledge Systems
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Service modules	Faculty of Engineering, Built Environment and Information Technology
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Prerequisites	Admission to the exam in OBS 359
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Contact time	2 lectures per week
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Language of tuition	Module is presented in English
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Department	Business Management
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Period of presentation	Semester 2
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Module content

International financial management

Purpose, scope and principles of international financial management; international cashflow management; foreign exchange risk and foreign exchange risk management; international investment and financing decisions; import and export management; import and export financing, and international purchasing and sourcing.

International management, leadership and market entry

International management and leadership; dimensions of strategic international human resource management; international market entry and introduction to international marketing strategy, and future perspectives on Southern Africa as an emerging market.

Business analytics 370 (OBS 370)

Qualification	Undergraduate
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Module credits	20.00
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Programmes	BIT Information Systems
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Prerequisites	Admission to exam in OBS 359.
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Contact time	3 lectures per week
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Language of tuition	Module is presented in English
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Department	Business Management
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Period of presentation	Semester 2
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Module content

Evaluates how to strategically align, plan for and direct investments in, and governance of, processes for continuous renewal of analytic deployments in business. An overview of analytics in the business context will be provided that will cover: concepts of strategic and operational analytics; overview of concepts like dimensional modeling, the Model Life cycle, data mining, big data, KPIs and metrics, ERP and analytics, in-database/memory analytics; real-time analytics and data stream analysis. The applied decision making aspect will focus on mastering quantitative modeling tools and techniques for business decision-making and deterministic optimisation techniques.

Theory of development communication 880 (OKT 880)

Qualification	Postgraduate
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Module credits	20.00
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Prerequisites	No prerequisites.
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Contact time	8 lectures per week
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Language of tuition	Module is presented in English
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Department	Information Science
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Period of presentation	Year
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Module content

This module focuses on human development and the principle of participatory communication. It examines communication theory and processes especially with regard to communication and social change. The student should be able to work effectively with others in establishing participative development communication principles, collect, analyse and critically evaluate existing literature on development communication, and demonstrate that communication forms an integral part of community development practices.

Management of development communication 881 (OKT 881)

Qualification	Postgraduate
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Module credits	20.00
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Prerequisites	No prerequisites.
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Contact time	1 lecture per week
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Language of tuition	Module is presented in English
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Department	Information Science
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Period of presentation	Year
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Module content

This module will be offered from a management perspective and will examine the role of development within the strategic management processes of an organisation. It will include the evaluation of development projects to suit the strategic objectives of the organisation and how to manage communication within a development project.

Practice of development communication 882 (OKT 882)

Qualification	Postgraduate
Module credits	20.00
Prerequisites	No prerequisites.
Contact time	8 lectures per week
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Year

Module content

The focus of this module is the practical side of development communication. It includes: methods to research the target audience, action programmes for communication campaigns in communities and the different channels that can be used for the dissemination of development messages.

It also contains a component in which a development message must be designed by taking into account target group, appropriate channel and distribution.

Information centres and development communication 883 (OKT 883)

Qualification	Postgraduate
Module credits	20.00
Prerequisites	No prerequisites.
Contact time	8 lectures per week
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Year

Module content

This module will focus on the role of information centres in disseminating development information. Centres that will be studied as possible distribution points will include community libraries, telecentres and multi-purpose community centres.

Mini-dissertation: Development communication 895 (OKT 895)

Qualification	Postgraduate
Module credits	90.00
Prerequisites	No prerequisites.

Language of tuition	Module is presented in English
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Department	Information Science
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Period of presentation	Year
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Module content

A report (80-100 pages) on an approved research project. Coursework.

Design communication 120 (OKU 120)

Qualification	Undergraduate
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Module credits	6.00
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Programmes	BSc Architecture BSc Interior Architecture BSc Landscape Architecture
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Prerequisites	No prerequisites.
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Language of tuition	Module is presented in English
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Department	Architecture
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Period of presentation	Semester 2
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Module content

Quarter 3: Introduction to basic computer aided design.

Quarter 4: Introduction to the theory of structures: Forces, moments, stresses, strains, Young's Modulus, Structural components: beams, columns and trusses.

Design communication 200 (OKU 200)

Qualification	Undergraduate
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Module credits	6.00
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Prerequisites	No prerequisites.
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Contact time	1 lecture per week, 1 studio hour per week
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Language of tuition	Module is presented in English
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Department	Architecture
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Period of presentation	Year
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Module content

Visual communication, digital visualisation and representation tools. Communicating the complexity of projects in design and construction.

Design communication 300 (OKU 300)

Qualification	Undergraduate
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Module credits	6.00
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Programmes	BSc Architecture BSc Interior Architecture BSc Landscape Architecture
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Prerequisites	ONT 200/ONT 202/ONT 203
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Contact time	1 lecture per week, 1 studio hour per week
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Language of tuition	Module is presented in English
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Department	Architecture
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Period of presentation	Year
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Module content

Advanced digital visualisation and representation tools to support design projects. Document and building information management.

Design communication 313 (OKU 313)

Qualification	Undergraduate
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Module credits	6.00
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Prerequisites	No prerequisites.
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Language of tuition	Module is presented in English
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Department	Architecture
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Period of presentation	Semester 1
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Module content

Digital graphic and presentation techniques.

History of the environment 310 (OMG 310)

Qualification	Undergraduate
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Module credits	6.00
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Programmes	BSc Architecture BSc Interior Architecture BSc Landscape Architecture
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Prerequisites	No prerequisites.
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Contact time	2 lectures per week
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Language of tuition	Module is presented in English
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Department	Architecture
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Period of presentation	Semester 1
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Module content

History of the environment of African societies between the tropics within global context until the present.

History of the environment 320 (OMG 320)

Qualification	Undergraduate
Module credits	6.00
Programmes	BSc Architecture BSc Interior Architecture BSc Landscape Architecture
Prerequisites	No prerequisites.
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Architecture
Period of presentation	Semester 2

Module content

History of the environment of Southern African societies from the old Stone Age until the present.

Environmental theory 110 (OML 110)

Qualification	Undergraduate
Module credits	6.00
Programmes	BSc Architecture BSc Interior Architecture BSc Landscape Architecture
Prerequisites	No prerequisites.
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Architecture
Period of presentation	Semester 1

Module content

Introductory contextualisation of twentieth century artefacts within the framework of history from Antiquity to Modernity. Building types as artefacts of material culture. Approaches and guidelines to the study of history of the environment. Understanding of the process of endemic construction and its monumentalisation, settlement and urbanisation of various ages and environments. An interdisciplinary investigation of living spaces as shapers of social interaction. The history of the environment of the Mediterranean Antique, Bronze Age, Classical and Biblical societies.

Environmental studies 120 (OML 120)

Qualification	Undergraduate
Module credits	6.00

Programmes	BSc Architecture BSc Interior Architecture BSc Landscape Architecture
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Prerequisites	No prerequisites.
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Contact time	2 lectures per week
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Language of tuition	Module is presented in English
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Department	Architecture
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Period of presentation	Semester 2
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Module content

The history of the environment of and the link between North-Europe and the Mediterranean area, the Arabic peninsula and the Indies, from the fall of Jerusalem up until the fall of Constantinople in 1453 AD. Tao, Shinto and the landscape of the Far East.

Environmental theory 210 (OML 210)

Qualification	Undergraduate
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Module credits	6.00
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Programmes	BSc Architecture BSc Interior Architecture BSc Landscape Architecture
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Prerequisites	No prerequisites.
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Contact time	2 lectures per week
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Language of tuition	Module is presented in English
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Department	Architecture
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Period of presentation	Semester 1
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Module content

The history of the environment and the link between North-Europe and a newly discovered world from the time of the circumnavigation of the southernmost Cape Point of Africa till the Industrial Revolution.

Environmental studies 220 (OML 220)

Qualification	Undergraduate
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Module credits	6.00
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Programmes	BSc Architecture BSc Interior Architecture BSc Landscape Architecture
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Prerequisites	No prerequisites.
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Contact time	2 lectures per week
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Language of tuition	Module is presented in English
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Department	Architecture
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Period of presentation	Semester 2
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Module content

History of the environment of Western societies and their dominions from the Industrial Revolution up to the intellectual questioning of Modernism. Southern African housing typologies and Western artefacts as manifestation of socio-political realities since 1488 AD.

Design 100 (ONT 100)

Qualification	Undergraduate
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Module credits	60.00
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Programmes	BSc Architecture BSc Interior Architecture BSc Landscape Architecture
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Prerequisites	No prerequisites.
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Contact time	17 studio hours per week, 2 lectures per week
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Language of tuition	Module is presented in English
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Department	Architecture
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Period of presentation	Year
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Module content

Introduction to design and integration with supporting modules. Design principles, skills and techniques. Small-scale design projects and environmental influences (physical, social, cultural, historical), space requirements and creative interpretation. Acquisition of skills in design communication through imagination, intuition and conceptual thinking. Relation of internal to external space. Anthropometry and ergonomics; visual literacy (visual media, analysis and interpretation) and criticism. The designer as visual thinker. Perception; ideograms. Development of a vocabulary to describe and illustrate the discipline of design. Pertinent theory that informs and supports the design process.

Design 200 (ONT 200)

Qualification	Undergraduate
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Module credits	60.00
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Programmes	BSc Architecture
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Prerequisites	AAL 110, KON 111, KON 121, OML 110, OML 120 and ONT 100
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Contact time	17 studio hours per week, 2 lectures per week
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Language of tuition	Module is presented in English
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Department	Architecture
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Period of presentation	Year
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Module content

The process and product of design through the integration of supporting modules. Spatial design as response to tectonic and contextual influences. The production of space and the reading of place as central concerns in the design disciplines. The design of residential and simple public spaces and buildings with the emphasis on planning, plan-making, structure and economy as design determinants. Skills: programming, site analysis, time management, advanced graphic and reprographic techniques.

Pertinent theory that informs and supports the design process in architecture.

Design 202 (ONT 202)

Qualification	Undergraduate
Module credits	60.00
Programmes	BSc Landscape Architecture
Prerequisites	AAL 110, KON 111, KON 121, OML 110, OML 120 and ONT 100
Contact time	17 studio hours per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Architecture
Period of presentation	Year

Module content

The process and product of design through the integration of supporting modules. Site planning and design; design determinants. Exploration of meaning and integrity in landscape design. Skills: programming, site analysis, creative design, time management, advanced graphic techniques, reprographic techniques. Pertinent theory that informs and supports the design process in landscape architecture.

Design 203 (ONT 203)

Qualification	Undergraduate
Module credits	60.00
Programmes	BSc Interior Architecture
Prerequisites	AAL 110, KON 111, KON 121, OML 110, OML 120 and ONT 100
Contact time	17 studio hours per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Architecture
Period of presentation	Year

Module content

The process and product of design through the integration of supporting modules. Spatial design as response to user. Design of inclusive environments, reuse of architectural space, planning and form-giving processes, production and identity as design determinants. The influence of perception, ergonomics and the tectonics on space making. Scenographic, product, exhibition or installation design. Skills: programming, architectural space analysis, time management, advanced graphic and reprographic techniques. Pertinent theory that informs and supports the design process in interior architecture.

Design 300 (ONT 300)

Qualification	Undergraduate
Module credits	52.00
Programmes	BSc Architecture
Prerequisites	KON 210, KON 220, OML 210, OML 220 and ONT 200
Contact time	17 studio hours per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Architecture
Period of presentation	Year

Module content

The process of design through the integration of supporting modules. Lateral thinking and ritual as design informants. The design of a mixed-use project in an urban context with a complex programme developed to construction drawings in the Construction modules. Statutory requirements, feasibility and payability studies. Theory of normative positions and the relationship between global intellectual movements and the local debate. Appraising the state of current design production and the establishment of identity through design.

Design 302 (ONT 302)

Qualification	Undergraduate
Module credits	52.00
Programmes	BSc Landscape Architecture
Prerequisites	KON 210, KON 220, OML 210, OML 220 and ONT 202
Contact time	17 studio hours per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Architecture
Period of presentation	Year

Module content

The process of design through the integration of supporting modules. Understanding and investigating urban form, urban ecology and site ecology. Site planning: exploration of complexities at neighbourhood and regional scale including ecological, economic and social planning aspects. Design: framework and master planning at regional context.

Exploration of detail urban ecology, economic and social aspects, and historic and cultural environments. Site planning: Interdisciplinary problem solving with emphasis on site design and sustainable and appropriate technologies. Design: complex detail design and sketch plans developed to construction drawings in KON 320. Theory of normative positions and the relationship between global intellectual movements and the local debate. Appraising the state of current design production and the establishment of identity through design.

Design 303 (ONT 303)

Qualification	Undergraduate
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Module credits	52.00
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Programmes	BSc Interior Architecture
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Prerequisites	KON 210, KON 220, OML 210, OML 220 and ONT 203
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Contact time	17 studio hours per week, 2 lectures per week
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Language of tuition	Module is presented in English
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Department	Architecture
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Period of presentation	Year
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Module content

The process of design through the integration of supporting modules. The design of spaces with the emphasis on lateral thinking and ritual through adaptive reuse.

The design of a commercial project in an existing architectural envelope in an urban context with a complex program developed to construction drawings in KON 320. Corporate identity, statutory requirements, feasibility and payability studies, tenant mix. Theory of normative positions and the relationship between global intellectual movements and the local debate. Appraising the state of current design production and the establishment of identity through design.

Public administration 112 (PAD 112)

Qualification	Undergraduate
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Module credits	10.00
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Programmes	BA BAdmin Public Management and International Relations BCom BIS Information Science BPolSci Political Studies
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Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Humanities
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Prerequisites	No prerequisites.
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Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	School of Public Management and Administration
Period of presentation	Semester 1

Module content

This module in public administration is designed specifically to assist students in understanding the role of public administration in a modern state, the unique characteristics of public administration, the schools and approaches in public administration and introducing the various generic administrative functions. The discipline of public administration has developed rapidly and by implication, has changed and shifted its paradigm over the years. The purpose of this module is to introduce public administration to the student as a field of study that makes a significant contribution to the effective administration and management of government institutions.

Public administration 122 (PAD 122)

Qualification	Undergraduate
Module credits	10.00
Programmes	BA BAdmin Public Management and International Relations BCom BIS Information Science BPolSci Political Studies
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Humanities
Prerequisites	PAD 112 GS
Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	School of Public Management and Administration
Period of presentation	Semester 2

Module content

This module in public administration will introduce the constitutional framework pertaining to public administration. The South African system of government, the functions, role and powers of the executive, legislative and judicial branches of government as well as the functioning of the three spheres of government will be discussed. The module will enable the student to understand how and where public administration is practiced.

Basic mine ventilation engineering 321 (PEE 321)

Qualification	Undergraduate
Module credits	8.00
Programmes	BEng Mining Engineering BEng Mining Engineering ENGAGE

Prerequisites	MTV 310 GS
Contact time	2 lectures per week, 2 tutorials per week
Language of tuition	Module is presented in English
Department	Mining Engineering
Period of presentation	Semester 2

Module content

Mine ventilation methods; primary and secondary ventilation methods, ventilation strategies for coal and hard rock mining environments including base metal mines. Mine development ventilation methods, mine air control, different types of fans including fan performances and air dilution calculations.

Mine ventilation engineering 410 (PEE 410)

Qualification	Undergraduate
Module credits	8.00
Programmes	BEng Mining Engineering BEng Mining Engineering ENGAGE
Prerequisites	PEE 321
Contact time	2 lectures per week, 2 tutorials per week
Language of tuition	Module is presented in English
Department	Mining Engineering
Period of presentation	Semester 1

Module content

Refrigeration: Elementary refrigeration principles, including concepts and methods, chilled water systems, including cooling distribution methods. Elementary mine ventilation planning, basic planning parameters and elementary mine ventilation economics and the impact of incorrect design and applications on safety and health. Mine gases, their origin and gas/coal dust explosions. Aspects of the Mine Health and Safety act are also dealt with.

People management 883 (PEM 883)

Qualification	Postgraduate
Module credits	10.00
Programmes	MEng Engineering Management (Coursework) MSc Engineering Management (Coursework)
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	No prerequisites.
Contact time	20 contact hours per semester
Language of tuition	Module is presented in English
Department	Human Resource Management

Period of presentation Semester 1 or Semester 2

Module content

The aim of this module is to equip engineering managers with the key competencies they require for managing in both South African and International Engineering and Technology environments. The module focuses on key elements of organisational behaviour and explains how to manage individuals, teams and organisations with regard to various dimensions of thereof including: individual diversity, emotional intelligence, motivation and team performance, communication, leadership, power and politics, organisational culture and stress, with a view to optimising performance in organisations. Furthermore, the module aims at developing an understanding of talent management processes with a focus on the relationship between the HR department and the engineering manager, the aim being to highlight the role of the latter in the management of people.

People management 884 (PEM 884)

Qualification Postgraduate

Module credits 10.00

Service modules Faculty of Engineering, Built Environment and Information Technology

Prerequisites No prerequisites.

Language of tuition Module is presented in English

Department Human Resource Management

Period of presentation Semester 1

Module content

While the cliché “Our company’s most important asset is our people” is often used, the aim of the PEM 884 module is to bring life to this statement, equipping managers in the technology environment to manage people in a way that enhances both their value and humanity. The module centres around challenges in the technology environment for the 21st century, considering how organisational behaviour and human resource management processes can be used in mastering these. The module includes aspects such as managing individuals, teams and organisations with regard to various dimensions of behaviour including: individual diversity, emotional intelligence, motivation and team performance, group dynamics in managing teams, communication, leadership, power and politics, organisational culture, organisational change and stress, labour relations and human resource processes.

Financial mine valuation 780 (PFZ 780)

Qualification Postgraduate

Module credits 16.00

Programmes [BEngHons Mining Engineering](#)

Prerequisites No prerequisites.

Contact time Self study

Language of tuition Module is presented in English

Department Mining Engineering

Period of presentation Semester 1 or Semester 2

Slope stability 781 (PHS 781)

Qualification	Postgraduate
Module credits	16.00
Prerequisites	No prerequisites.
Contact time	Self study
Language of tuition	Module is presented in English
Department	Mining Engineering
Period of presentation	Semester 1 or Semester 2

First course in physics 114 (PHY 114)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEd Senior Phase and Further Education and Training Teaching BSc Applied Mathematics BSc Chemistry BSc Computer Science BSc Engineering and Environmental Geology BSc Geography BSc Geology BSc Mathematics BSc Meteorology BSc Physics
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education
Prerequisites	A candidate must have passed Mathematics and Physical Science with at least 60% in the Grade 12 examination
Contact time	1 discussion class per week, 1 practical per week, 4 lectures per week
Language of tuition	Module is presented in English
Department	Physics
Period of presentation	Semester 1

Module content

SI-units. Significant figures. Waves: intensity, superposition, interference, standing waves, resonance, beats, Doppler. Geometrical optics: Reflection, refraction, mirrors, thin lenses, instruments. Physical optics: Young-interference, coherence, diffraction, polarisation. Hydrostatics and dynamics: density, pressure, Archimedes' principle, continuity, Bernoulli. Heat: temperature, specific heat, expansion, heat transfer. Vectors. Kinematics of a point: Relative, projectile, and circular motion. Dynamics: Newton's laws, friction. Work: point masses, gasses (ideal gas law), gravitation, spring, power. Kinetic energy: Conservative forces, gravitation, spring. Conservation of energy. Conservation of momentum. Impulse and collisions. System of particles: Centre of mass, Newton's laws. Rotation: torque, conservation of angular momentum, equilibrium, centre of gravity.

First course in physics 124 (PHY 124)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEd Senior Phase and Further Education and Training Teaching BSc Applied Mathematics BSc Chemistry BSc Computer Science BSc Extended programme - Physical Sciences BSc Geography BSc Mathematics BSc Meteorology BSc Physics
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education
Prerequisites	WTW 114 GS and PHY 114 GS
Contact time	1 discussion class per week, 1 practical per week, 4 lectures per week
Language of tuition	Module is presented in English
Department	Physics
Period of presentation	Semester 2

Module content

Simple harmonic motion and pendulums. Coulomb's law. Electric field: dipoles, Gauss' law. Electric potential. Capacitance. Electric currents: resistance, resistivity, Ohm's law, energy, power, emf, RC-circuits. Magnetic Field: Hall-effect, Bio-Savart. Faraday's and Lenz's laws. Oscillations: LR-circuits. Alternating current: RLC-circuits, power, transformers. Introductory concepts to modern physics. Nuclear physics: Radioactivity.

Physics for biology students 131 (PHY 131)

Qualification	Undergraduate
Module credits	16.00
Programmes	BSc Computer Science
Service modules	Faculty of Education Faculty of Health Sciences Faculty of Veterinary Science
Prerequisites	A candidate must have passed Mathematics with at least 60% in the Grade 12 examination
Contact time	1 discussion class per week, 1 practical per week, 4 lectures per week
Language of tuition	Module is presented in English
Department	Physics
Period of presentation	Semester 1

Module content

Units, vectors, one dimensional kinematics, dynamics, work, equilibrium, sound, liquids, heat, thermodynamic processes, electric potential and capacitance, direct current and alternating current, optics, modern physics, radio activity.

Physics 133 (PHY 133)

Qualification	Undergraduate
Module credits	8.00
Programmes	BSc Extended programme - Biological and Agricultural Sciences BSc Extended programme - Mathematical Sciences BSc Extended programme - Physical Sciences
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education
Prerequisites	Admission to the relevant programme.
Contact time	2 discussion classes per week, 2 lectures per week, 2 practicals per week, Foundation Course
Language of tuition	Module is presented in English
Department	Physics
Period of presentation	Semester 1

Module content

Heat: temperature and scales, work, energy and heat, calorimetry, specific heat, expansion, heat transfer. Measurements: SI-units, measuring error and uncertainty, (graphs), significant figures, mathematical modelling. One-dimensional kinematics. Geometrical optics: reflection, refraction, dispersion, mirrors, thin lenses.

Physics 143 (PHY 143)

Qualification	Undergraduate
Module credits	8.00
Programmes	BSc Extended programme - Mathematical Sciences BSc Extended programme - Physical Sciences
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education
Prerequisites	PHY 133
Contact time	2 discussion classes per week, 2 lectures per week, 2 practicals per week, Foundation Course
Language of tuition	Module is presented in English
Department	Physics
Period of presentation	Semester 2

Module content

Vectors. Kinematics of a point: relative motion, projectile, circular motion. Dynamics: Newton's laws, friction. Work: point masses, ideal gas law, springs, power. Energy: kinetic energy, potential energy, conservative forces, spring, conservation of mechanical energy. Hydrostatics and dynamics: density, pressure, Archimedes' law, continuity, Bernouli.

Physics 153 (PHY 153)

Qualification	Undergraduate
Module credits	8.00
Programmes	BSc Extended programme - Mathematical Sciences BSc Extended programme - Physical Sciences
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	PHY 143
Contact time	2 discussion classes per week, 2 practicals per week, 3 lectures per week, Foundation Course
Language of tuition	Module is presented in English
Department	Physics
Period of presentation	Semester 1

Module content

System of particles: centre of mass, Newton's laws. Rotation: torque, conservation of momentum, impulse and collision, conservation of angular momentum, equilibrium, centre of gravity. Oscillations. Waves: sound, intensity, superposition, interference, standing waves, resonance, beats, Doppler effect. Physical optics: Young-interference, coherence, thin layers, diffraction, gratings, polarisation.

Electronics, electromagnetism and quantum mechanics 356 (PHY 356)

Qualification	Undergraduate
Module credits	36.00
Programmes	BSc Computer Science
Service modules	Faculty of Education
Prerequisites	PHY 255 GS and PHY 263 GS and WTW 211 GS and WTW 218 GS and WTW 248 GS
Contact time	1 practical per week, 2 discussion classes per week, 4 lectures per week
Language of tuition	Module is presented in English
Department	Physics
Period of presentation	Semester 1

Module content

Electronics (14 lectures)

Thévenin and Norton equivalent circuits, superposition principle, RC, LC and LRC circuits. Semiconductor diode. Bipolar transistor. Operational amplifiers. Computer controlled instrumentation.

Electromagnetism (21 lectures)

Electrostatics: Coulomb's law, divergence and curl of E , Gauss' law, Laplace's equation, image charge problems, multipole expansion.

Magnetostatics: Lorenz force, Biot-Savart law, divergence and curl of magnetic field strength, Ampère's law, magnetic vector potential, multipole expansion, boundary conditions.

Electrodynamics: Electromotive force, electromagnetic induction, Maxwell's equations, wave equation.

Electric and magnetic fields in matter: Polarisation, electric displacement and Gauss's law in dielectrics, linear dielectrics. Magnetisation (diamagnets, paramagnets, ferromagnets), auxiliary field H and Ampère's law in magnetised materials, linear and nonlinear media.

Quantum mechanics (28 lectures)

The Schrödinger equation, the statistical interpretation of the wave function, momentum, the uncertainty principle, the time-independent Schrödinger equation, stationary states, the infinite square well potential, the harmonic oscillator, the free particle, the Delta-Function potential, the finite square well potential, Hilbert spaces, observables, eigen functions of a Hermitian operator, Dirac notation, the Schrödinger equation in spherical coordinates, the hydrogen atom, angular momentum spin.

Statistical mechanics, solid state physics and modelling 364 (PHY 364)

Qualification	Undergraduate
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Module credits	36.00
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Programmes	BSc Computer Science
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Service modules	Faculty of Education
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Prerequisites	PHY 356 and WTW 211 and WTW 218 and WTW 248 GS
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Contact time	2 discussion classes per week, 2 practicals per week, 4 lectures per week
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Language of tuition	Module is presented in English
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Department	Physics
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Period of presentation	Semester 2
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Module content

Statistical mechanics (28 lectures)

Isolated systems in thermodynamical equilibrium. Systems in equilibrium with a heat bath: the canonical ensemble, Gibbs' entropic formula, classical statistical mechanics, energy equipartition theorem, thermodynamic potentials, paramagnetism.

The classical limit of perfect gases: non-distinguishable character of quantum particles, the equation of state of the classical ideal gas. Quantum perfect gases: Black body radiation, the grand canonical ensemble, Fermi-Dirac distribution, the free electron gas in metals, the Bose-Einstein distribution, Bose-Einstein condensation.

Solid state physics (28 lectures)

Crystal structures, the reciprocal lattice, x-ray diffraction, lattice vibration, the Debye model, characteristics of solids, the free electron model, Pauli paramagnetism, electronic heat capacity, the relaxation time, electrical conduction, the classical Hall effect, thermal conduction in metals, failures of the free electron model, the independent electron model, band theory of solids.

Computational Physics and modelling. Assessment will be done through a portfolio of project reports. The topics for the projects will be selected from various sub-disciplines of Physics.

Professional and technical communication 210 (PJJ 210)

Qualification Undergraduate

Module credits 8.00

Programmes [BEng Mining Engineering](#)
[BEng Mining Engineering ENGAGE](#)

Prerequisites PMY 121

Contact time 2 lectures per week, 2 other contact sessions per week

Language of tuition Module is presented in English

Department Mining Engineering

Period of presentation Semester 1

Module content

Communicate effectively, both orally and in writing, with engineering audiences and the community at large. Written communication as evidenced by: uses appropriate structure, use of modern or electronic communication methods; style and language for purpose and audience; uses effective graphical support; applies methods of providing information for use by others involved in engineering activity; meets the requirements of the target audience. Effective oral communication as evidenced by appropriate structure, style and language; appropriate visual materials; delivers fluently; meets the requirements of the intended audience. Audiences range from engineering peers, management and lay persons, using appropriate academic or professional discourse. Typed reports range from short (300-1 000 word plus tables diagrams) to long (10 000-15 000 words plus tables, diagrams, references and appendices), covering material at exit level. Methods of providing information include the conventional methods of the discipline, for example engineering drawings, as well as subject-specific methods.

Practice management 310 (PJS 310)

Qualification Undergraduate

Module credits	8.00
Programmes	BSc Architecture BSc Interior Architecture BSc Landscape Architecture
Prerequisites	No prerequisites.
Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	Architecture
Period of presentation	Semester 1

Module content

Management of an architectural practice and architectural project from inception up to local authority submission.

Basic mine ventilation engineering 701 (PKB 701)

Qualification	Postgraduate
Module credits	16.00
Programmes	BScHons Applied Science Mining
Prerequisites	No prerequisites.
Contact time	Self study
Language of tuition	Module is presented in English
Department	Mining Engineering
Period of presentation	Semester 1 or Semester 2

Airflow and fans 711 (PKB 711)

Qualification	Postgraduate
Module credits	16.00
Programmes	BEngHons Mining Engineering
Prerequisites	No prerequisites.
Contact time	Self study
Language of tuition	Module is presented in English
Department	Mining Engineering
Period of presentation	Semester 1 or Semester 2

Heat and refrigeration 712 (PKB 712)

Qualification	Postgraduate
Module credits	16.00

Programmes	BEngHons Mining Engineering
Prerequisites	No prerequisites.
Contact time	Self study
Language of tuition	Module is presented in English
Department	Mining Engineering
Period of presentation	Semester 1 or Semester 2

Mineral economics 320 (PME 320)

Qualification	Undergraduate
Module credits	16.00
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Mining Engineering
Period of presentation	Semester 2

Module content

The objective is for the student to understand fundamental economic theory pertaining to the mineral and mining industry and its overall effects on the broader South African economy. The student will be able to interpret and understand company annual results. The student should be able to understand and apply the SAMREC/SAMVAL code during the evaluation and classification of resources and reserves. The student should understand the effect of supply and demand pertaining to the mineral and mining industry (micro and macro economic factors). To understand the unique aspects related to marketing of minerals with reference to the cyclic nature of the industry. Apply economic and engineering reasoning to specific problems in the minerals and mining industry so as to analyse and interpret the opportunities and threats facing this industry. To understand and apply the fundamentals of technical mine valuation, including mineral rights, prospecting methods, sampling, mass and mineral content of ore as well as management and control factors. The latter include controlling and managing of widths, stoping width versus tramming and milling width, ore dilution, mine call factor and cut-off grade.

Property investment 701 (PMN 701)

Qualification	Postgraduate
Module credits	6.00
Prerequisites	No prerequisites.
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Construction Economics
Period of presentation	Semester 1

Module content

The nature and scope of real estate investment, objectives of property developers, participants in the property investment process, the investment decision process, investment criteria, investment time horizons, decision making approaches.

Property investment 720 (PMN 720)

Qualification	Postgraduate
Module credits	6.00
Programmes	BScHons Real Estate Retail Property
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Construction Economics
Period of presentation	Semester 1 or Semester 2

Module content

The nature and scope of real estate investment, objectives of property developers, participants in the property investment process, the investment decision process, investment criteria, investment time horizons, decision making approaches

Property Investment 820 (PMN 820)

Qualification	Postgraduate
Module credits	10.00
Programmes	MSc Real Estate Retail Property (Coursework) MSc Real Estate (Coursework)
Prerequisites	No prerequisites.
Contact time	20 contact hours per semester
Language of tuition	Module is presented in English
Department	Construction Economics
Period of presentation	Semester 2

Mine evaluation 410 (PMW 410)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Mining Engineering BEng Mining Engineering ENGAGE
Prerequisites	No prerequisites.
Contact time	2 tutorials per week, 3 lectures per week
Language of tuition	Module is presented in English

Department	Mining Engineering
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Period of presentation	Semester 1
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Module content

The objective is for the student to understand fundamental economic theory pertaining to the mineral and mining industry and its overall effects on the broader South African economy. The student will be able to interpret and understand company annual results. The student should be able to understand and apply the SAMREC/SAMVAL code during the evaluation and classification of resources and reserves. The student should understand the effect of supply and demand pertaining to the mineral and mining industry (micro and macroeconomic factors). To understand the unique aspects related to marketing of minerals with reference to the cyclic nature of the industry. Apply economic and engineering reasoning to specific problems in the minerals and mining industry so as to analyse and interpret the opportunities and threats facing this industry. To understand and apply the fundamentals of technical mine valuation, including mineral rights, prospecting methods, sampling, mass and mineral content of ore as well as management and control factors. The latter include controlling and managing of widths, stoping width versus tramming and milling width, ore dilution, mine call factor and cut-off grade.

Introduction to mining 121 (PMY 121)

Qualification	Undergraduate
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Module credits	8.00
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Programmes	BEng Mining Engineering BEng Mining Engineering ENGAGE
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Prerequisites	No prerequisites.
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Contact time	2 lectures per week, 2 tutorials per week
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Language of tuition	Module is presented in English
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Department	Mining Engineering
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Period of presentation	Semester 2
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Module content

Introduction: Mining in South Africa: Overview of mining and history in South Africa, Minerals and mining. Surface mining: surface mining method, surface mining planning, rock breaking, rock loading and transport. Underground hard rock mining: A mine in outline, explanation of underground mining terms, basic mine layouts, shafts, development, stoping methods, compressed air, water and electrical reticulation. Underground coal mining: planning and development, rock breaking: stoping and tunnelling. Mine environmental engineering: ventilation practice, airflow, fans, gases, heat, psychrometry. Mine strata control: strata control in deep and shallow underground mines, strata control in coal mines.

Introduction to mining 210 (PMY 210)

Qualification	Undergraduate
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Module credits	8.00
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Language of tuition	Module is presented in English
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Department	Mining Engineering
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Period of presentation Semester 2

Module content

Introduction: Mining in South Africa: Overview of mining and history in South Africa, Minerals and mining. Surface mining: Surface mining methods, Surface mining planning, Rock breaking, Rock loading and transport. Underground hard rock mining: A mine in outline, explanation of underground mining terms, basic mine layouts, shafts, development, stoping methods, compressed air, water and electrical reticulation. Underground coal mining: planning and development, rock breaking: stoping and tunnelling. Mine environmental engineering: ventilation practice, airflow, fans, gases, heat, psychrometry. Mine strata control: strata control in deep and shallow underground mines, strata control in coal mines.

Mining technology 220 (PMY 220)

Qualification Undergraduate

Module credits 8.00

Programmes [BEng Mining Engineering](#)
[BEng Mining Engineering ENGAGE](#)

Prerequisites PJJ 210, MPR 213 GS

Contact time 2 lectures per week, 2 other contact sessions per week

Language of tuition Module is presented in English

Department Mining Engineering

Period of presentation Semester 2

Module content

Various technologies are found within the mining industry ranging from simple modelling packages to expert level optimisation and implementation packages. This module introduce the terminology used in mining technology and software applications, explaining the applications and limitations of these. This module includes Computer aided Design (CAD) techniques, graphical systems, geological modelling and geostatistical evaluation, scheduling, optimisation and numerical modelling.

Surface mining 311 (PMY 311)

Qualification Undergraduate

Module credits 16.00

Programmes [BEng Mining Engineering](#)
[BEng Mining Engineering ENGAGE](#)

Prerequisites PMY 220 GS

Contact time 2 tutorials per week, 3 lectures per week

Language of tuition Module is presented in English

Department Mining Engineering

Period of presentation Semester 1

Module content

Surface mining methods: Introduction, classification of ore reserves and terminology. Earth moving: Loading shovels and methods, haulage trucks, productivity and tires, introduction to bucket wheel excavators, conveyor systems and in-pit crushers, in-pit crushing-conveying system, application of draglines and terminology. Introduction to mine planning, mine development phases, block modelling, methods of sequencing, stripping ratios and breakeven ratios. Introduction to mining environment, rehabilitation and closure, integrated environmental management, environmental impact studies, water management and rehabilitation planning and costing.

Mining 320 (PMY 320)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Mining Engineering BEng Mining Engineering ENGAGE
Prerequisites	PMY 311, PPY 220
Contact time	2 tutorials per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Mining Engineering
Period of presentation	Semester 2

Module content

Mining 320 provides an overview of mining by covering the following subject-matter: history of mining in South Africa, underground mining systems, and a brief overview of mine environmental control and mine strata control. Then the module covers general mine layouts, mine plan reading, mine surveying, electricity supply, transport systems, water management systems, and mine fires. This feat is achieved through the study of various mining methods and case studies.

Mining 410 (PMY 410)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Mining Engineering BEng Mining Engineering ENGAGE
Prerequisites	PRX 321, PME 320, PMY 320, Finalists only
Contact time	1 tutorial per week, 2 practicals per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Mining Engineering
Period of presentation	Semester 1

Module content

Specific mining techniques. Shafts: Types, methods and equipment for sinking; economic considerations. Tunneling: Design, development techniques and equipment. Design and construction of large excavation. Design, construction, reinforcing and repair of ore passes. Fires in gold and coal mines: Causes, prevention, detection, combating and insurance. Flooding: Water sources, results, dangers, sealing and control.

Mine operational risk management 423 (PMY 423)

Qualification	Undergraduate
Module credits	8.00
Programmes	BEng Mining Engineering BEng Mining Engineering ENGAGE
Prerequisites	No prerequisites.
Contact time	1 discussion class per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Mining Engineering
Period of presentation	Semester 2

Module content

Selected topics in operational risk management; Introduction and context; Risk management concepts, words, and models; Risk assessment principles; Human factors; Leading practice; Layered risk management (including identification, assessment and control); Scoping risk assessment; Integrating outcomes into the business; ORM journey tool; Line management and OR; Safety and mineral Statistical Structures and Codes; Legal aspects.

Underground mining methods 701 (PMY 701)

Qualification	Postgraduate
Module credits	32.00
Programmes	BScHons Applied Science Mining
Prerequisites	No prerequisites.
Contact time	10 lectures per week
Language of tuition	Module is presented in English
Department	Mining Engineering
Period of presentation	Semester 1 or Semester 2

Module content

PMY 701 provides an overview of mining by covering the following subject matter: history of mining in South Africa, surface-mining methods, underground mining methods, and a brief overview of mine environmental control and mine strata control. Then the module covers general mine layouts, mine plan reading, mine surveying, electricity supply, transport systems, water management systems, and mine fires. Specific mining techniques. Shafts: Types, methods and equipment for sinking; economic considerations. Tunneling: Design, development techniques and equipment. Design and construction of large excavation. Design, construction, reinforcing and repair of ore passes. Fires in gold and coal mines: Causes, prevention, detection, combating and insurance. Flooding: Water sources, results, dangers, sealing and control.

Surface-mining 703 (PMY 703)

Qualification	Postgraduate
Module credits	16.00
Programmes	BScHons Applied Science Mining
Prerequisites	No prerequisites.
Contact time	10 lectures per week
Language of tuition	Module is presented in English
Department	Mining Engineering
Period of presentation	Semester 1 or Semester 2

Module content

Mining methods for open pits and strip mine operations. Basic mine planning, scheduling and economic cut-off limits with regards to waste stripping and ore grade. Continuous and discontinuous operations: Selection and management of truck-based loading and transport systems. Selection and management of conveyor-based loading and transport systems. Dragline selection, operation, management and strip mining practices. Slope stability in surface mines, plane, wedge and circular/non-circular failures.

Mine design and research 422 (PMZ 422)

Qualification	Undergraduate
Module credits	32.00
Programmes	BEng Mining Engineering BEng Mining Engineering ENGAGE
Prerequisites	PMY 410, PSZ 410, PEE 410. PNB 400, Finalists only
Contact time	4 lectures per week
Language of tuition	Module is presented in English
Department	Mining Engineering
Period of presentation	Semester 2

Module content

This module entails the completion of an engineering project from concept to delivery. The student must demonstrate mastery of a mining engineering project. The module focuses on the formulation of a mining engineering problem, the development of appropriate extraction methodologies, project planning and management and then completion of a technical project of a given nature, scope and complexity. Students are required to design a mine at the conceptual business case level. Students are given a surface plan and borehole data from which they have to design a mine in teams of 3 – 5 students. They have access to a mining engineer in industry to assist with advice. The design has to incorporate a market analysis, layout design, working method, surface layout, environmental impacts and financial analysis. The design is submitted in book form and each team member has to do a presentation of the design.

Advanced design: Mining 780 (PMZ 780)

Qualification	Postgraduate
Module credits	16.00
Programmes	BEngHons Mining Engineering
Prerequisites	No prerequisites.
Contact time	Self study
Language of tuition	Module is presented in English
Department	Mining Engineering
Period of presentation	Semester 1 or Semester 2

Industrial excursions 300 (PNB 300)

Qualification	Undergraduate
Module credits	8.00
Programmes	BEng Mining Engineering BEng Mining Engineering ENGAGE
Prerequisites	No prerequisites.
Contact time	3 practicals per week
Language of tuition	Module is presented in English
Department	Mining Engineering
Period of presentation	Semester 1

Module content

The mining industry requires that students are exposed to the mining industry by visiting a collection of mines with the purpose of familiarising them with current trends in mining practice and mining methods. This module hopes to provide a “snapshot” of the mining industry as it is at the time of the tour. This tour requires attendance and participation in five one-day visits to mines. The excursions are organised during the first semester of the third year, and take place during the July recess at the end of the semester. Students must, before the second semester commences, submit a group report on the visits during the second semester.

Industrial excursions 400 (PNB 400)

Qualification	Undergraduate
Module credits	8.00
Prerequisites	PNB 300, Finalists only
Language of tuition	Module is presented in English
Department	Mining Engineering
Period of presentation	Year

Module content

Attendance of and participation in industrial excursions organised during the year, including a ten-day excursion tour at the end of the first semester. Submission of reports and assignments as required.

Practical development feasibility 700 (POU 700)

Qualification	Postgraduate
Module credits	2.00
Programmes	BScHons Real Estate Retail Property
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Construction Economics
Period of presentation	Semester 1 and Semester 2

Practical development feasibility 720 (POU 720)

Qualification	Postgraduate
Module credits	2.00
Prerequisites	PRE000000544 Ebit Plan 12242014-12242016
Contact time	3 days excursion
Language of tuition	Module is presented in English
Department	Construction Economics
Period of presentation	Semester 2

Module content

The feasibility of a project is investigated by groups comprising students of the various fields of study in the built environment.

The projects are presented to a panel of judges comprising practitioners.

Open-pit mining 783 (POY 783)

Qualification	Postgraduate
Module credits	16.00

Programmes	BEngHons Mining Engineering
Prerequisites	No prerequisites.
Contact time	Self study
Language of tuition	Module is presented in English
Department	Mining Engineering
Period of presentation	Semester 1 or Semester 2

Experiential training 220 (PPY 220)

Qualification	Undergraduate
Module credits	16.00

Programmes	BEng Mining Engineering BEng Mining Engineering ENGAGE
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Mining Engineering
Period of presentation	Semester 2

Module content

The student needs to undergo practical mine training for a period of at least 6 weeks to be exposed to the mining environment, a report on this vacation work will be expected as per department guideline, in English only.

Experiential training 320 (PPY 320)

Qualification	Undergraduate
Module credits	16.00

Programmes	BEng Mining Engineering BEng Mining Engineering ENGAGE
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Mining Engineering
Period of presentation	Semester 2

Module content

The mining industry requires students to become exposed to mining by working on mines during the December recess period at the end of the second academic year. The student is required to work for a minimum period of six weeks on a mine, and then compile a report on the work completed for submission at a prescribed date in the first semester of the third academic year.

Project management 802 (PRB 802)

Qualification	Postgraduate
Module credits	20.00
Prerequisites	No prerequisites.
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Construction Economics
Period of presentation	Year

Dissertation: Project management 890 (PRB 890)

Qualification	Postgraduate
Module credits	180.00
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Construction Economics
Period of presentation	Year

Essay: Project management 892 (PRB 892)

Qualification	Postgraduate
Module credits	60.00
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Construction Economics
Period of presentation	Year

Rock breaking 321 (PRX 321)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Mining Engineering BEng Mining Engineering ENGAGE
Prerequisites	MTX 221 GS
Contact time	2 tutorials per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Mining Engineering
Period of presentation	Semester 2

Module content

The importance of improved safety standards, cost effectiveness and productivity has driven technical mining personnel to examine all facets of their operations. Increasingly, it has been realized that an efficient drilling and blasting program will impact positively throughout the mining operation, from loading to maintenance, hauling to crushing, ground support to scaling and grade control to recover with an invariable increase in the overall profitability through technical advanced projects. Through the safe, efficient and innovative use of explosives for rock breaking the mining engineer will make a positive contribution to the overall mining operation. Due to the nature of the topics discussed in this module, a number of case studies are used to emphasise the safe handling, application and destruction of explosives. The Mine Health and Safety Act is dealt with and the Explosives Act receives specific attention. The module also covers aspects of non-explosive rock breaking and cutting.

Explosives engineering 701 (PRX 701)

Qualification	Postgraduate
Module credits	16.00
Programmes	BScHons Applied Science Mining
Prerequisites	No prerequisites.
Contact time	10 lectures per week
Language of tuition	Module is presented in English
Department	Mining Engineering
Period of presentation	Semester 1 or Semester 2

Module content

History of explosives, types of explosives: primary and secondary explosives, thermodynamics of detonation, strength of explosives. Methods and techniques, explosive initiating systems, application of explosives in rock breaking; the effects of geology and drilling. Surface and underground blasting, controlled blasting, vibration control, air blast. Ethics and regulatory compliance. Equipment and calculations.

Rock breaking: Drilling and explosives 784 (PRX 784)

Qualification	Postgraduate
Module credits	16.00
Prerequisites	No prerequisites.
Contact time	Self study
Language of tuition	Module is presented in English
Department	Mining Engineering
Period of presentation	Semester 2

Advanced explosive engineering 785 (PRX 785)

Qualification	Postgraduate
Module credits	16.00

Programmes	BEngHons Mining Engineering
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Prerequisites	No prerequisites.
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Language of tuition	Module is presented in English
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Department	Mining Engineering
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Period of presentation	Semester 1 or Semester 2
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Module content

Types of commercial explosives. Properties of explosives. Explosive initiating systems, application of explosives in rock breaking; Surface and underground blast designs and specialised blast designs; the effects of geology on blast results. Fragmentation, blasting and environmental control. Blast assessment. Ethics and regulatory compliance. Safety in blasting.

Introduction to project 321 (PSC 321)

Qualification	Undergraduate
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Module credits	8.00
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Programmes	BEng Mining Engineering BEng Mining Engineering ENGAGE
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Prerequisites	PNB 300
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Contact time	1 tutorial per week, 2 lectures per week
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Language of tuition	Module is presented in English
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Department	Mining Engineering
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Period of presentation	Semester 2
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Module content

Reporting technical information: typical report structure, literature survey, data presentation (tables, graphs, diagrams), referencing, presenting results, conclusions, and recommendations. Identification of a suitable subject for the Final Year Project. Planning of project execution.

Project 411 (PSC 411)

Qualification	Undergraduate
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Module credits	16.00
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Programmes	BEng Mining Engineering BEng Mining Engineering ENGAGE
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Prerequisites	PSC 321, Finalists only
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Contact time	1 tutorial per week
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Language of tuition	Module is presented in English
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Department	Mining Engineering
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Period of presentation	Year
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Module content

The project involves the execution of an analytical and/or experimental research project under guidance of a lecturer. During the second semester of the third year of study students must select a suitable research topic, to be approved by the Head of the Department. Data for the approved project will be collected during the practical training period during the summer recess at the end of the third year of study. A comprehensive and detailed project report must be compiled and submitted for evaluation at a prescribed date in the first semester of the fourth year. The student must also prepare a presentation of the project for an oral examination at the end of the semester.

Research project 700 (PSS 700)

Qualification	Postgraduate
Module credits	32.00
Programmes	BEngHons Mining Engineering BScHons Applied Science Mining
Prerequisites	No prerequisites.
Contact time	Self study
Language of tuition	Module is presented in English
Department	Mining Engineering
Period of presentation	Year

Module content

*This is a compulsory research module.

Strata control 310 (PSZ 310)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Mining Engineering BEng Mining Engineering ENGAGE
Prerequisites	SWK 210
Contact time	2 tutorials per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Mining Engineering
Period of presentation	Semester 2

Module content

Three dimensional stress and strain tensors and linear elasticity. The state of stress in the earth's crust. Rock material and rock mass failure criteria. The response of the rock mass to underground excavations, energy release rate and excess shear stress. Mining induced seismicity, rock bursts and measures to minimise mining induced seismicity so as to improve SHE.

Geotechnics include understanding discontinuities in rock mass, stereo nets, cohesion and friction. Rock behaviour pertaining to excavations, understanding plane, circular and wedge failures, Rock slope safety factors. Slope stabilisation, neutral line theory, effects of water in a slope, monitoring of slopes and instruments available for slope stability monitoring, Risk concepts pertaining to slopes and a case study is discussed. Aspects of the Mine Health and Safety Act are also dealt with.

Rock engineering 410 (PSZ 410)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Mining Engineering BEng Mining Engineering ENGAGE
Prerequisites	PSZ 310 Finalists only
Contact time	2 tutorials per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Mining Engineering
Period of presentation	Semester 1

Module content

Elementary mine layout design, pillar design and underground excavation support and their effects on SHE. Stress analysis of mining layouts and mine layout optimisation. This module covers rock mechanics practice applicable in underground hard rock mining environments at shallow, moderate and great depth.

Basic rock mechanics 703 (PSZ 703)

Qualification	Postgraduate
Module credits	16.00
Programmes	BScHons Applied Science Mining
Prerequisites	No prerequisites.
Contact time	Self study
Language of tuition	Module is presented in English
Department	Mining Engineering
Period of presentation	Semester 1 or Semester 2

Strata control: Hard-rock mining 786 (PSZ 786)

Qualification	Postgraduate
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Module credits	16.00
Programmes	BEngHons Mining Engineering
Prerequisites	No prerequisites.
Contact time	Self study
Language of tuition	Module is presented in English
Department	Mining Engineering
Period of presentation	Semester 1 or Semester 2

Strata control: Hard-rock service excavations 787 (PSZ 787)

Qualification	Postgraduate
Module credits	16.00
Prerequisites	No prerequisites.
Contact time	Self study
Language of tuition	Module is presented in English
Department	Mining Engineering
Period of presentation	Semester 1

Strata control: Collieries 788 (PSZ 788)

Qualification	Postgraduate
Module credits	16.00
Prerequisites	(SWK 210)
Contact time	Self study
Language of tuition	Module is presented in English
Department	Mining Engineering
Period of presentation	Semester 1 or Semester 2

Rock support pillars 790 (PSZ 790)

Qualification	Postgraduate
Module credits	16.00
Prerequisites	No prerequisites.
Contact time	Self study
Language of tuition	Module is presented in English
Department	Mining Engineering
Period of presentation	Semester 2

Publishing: Introduction to publishing 110 (PUB 110)

Qualification	Undergraduate
Module credits	12.00
Programmes	BIS Publishing
Prerequisites	No prerequisites.
Contact time	1 practical per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Semester 1

Module content

*Closed – requires departmental selection.

Introduction to publishing. This module will focus on an introductory overview of publishing: the historical development of publishing; the publishing value chain; business and legal issues relating to the publishing industry; and the broader macro-context.

Publishing 120 (PUB 120)

Qualification	Undergraduate
Module credits	12.00
Programmes	BIS Publishing
Prerequisites	No prerequisites.
Contact time	1 practical per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Semester 2

Module content

*Closed - requires departmental selection.

The Book Publishing Environment. This module provides a basic introduction to the book publishing environment. The following aspects are highlighted: the concept "publishing"; different publishing industries and environments; contexts of book publishing; the publishing value chain; processes, tasks and role-players involved in book publishing; different sectors of the book publishing industry; different types of publishing houses; external role-players; initiatives; strategies; current trends and issues.

Publishing 210 (PUB 210)

Qualification	Undergraduate
Module credits	20.00
Programmes	BIS Multimedia BIS Publishing

Prerequisites	No prerequisites.
Contact time	3 lectures per week, 3 practicals per week
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Semester 1

Module content

*Closed - requires departmental selection.

Copy-editing. This module offers an introduction to copy-editing as a phase in the publishing process. Topics covered are the role of the copy-editor in the publishing value chain; the levels of editing; the responsibilities of the copy-editor towards the manuscript, the author and the publishing house; the responsibilities and skills of the proof-reader; typical problems in texts; proof-reading and copy-editing symbols and the mark-up of texts; as well as legal and ethical aspects of editing. Learners are also equipped with practical skills in proofreading and copy-editing both digital and print-based texts.

Publishing 220 (PUB 220)

Qualification	Undergraduate
Module credits	20.00
Programmes	BIS Publishing
Prerequisites	No prerequisites.
Contact time	3 lectures per week, 3 practicals per week
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Semester 2

Module content

*Closed - requires departmental selection.

The Visual and Production Dimensions of Publishing. This module offers a theoretical positioning of graphic design, reproduction and printing within the publishing process, as well as practical applications thereof. The following topics are addressed in the theoretical positioning: graphic design practice; the historical development of the relationship between reproduction and printing innovations and graphic design styles; the use of visual elements in publications; the management role of the editor in this phase. During the practical component learners are introduced to selected applications of DTP software and the practical aspects of the production phase.

Publishing 310 (PUB 310)

Qualification	Undergraduate
Module credits	30.00
Programmes	BIS Publishing
Prerequisites	No prerequisites.

Contact time	3 lectures per week, 3 practicals per week
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Language of tuition	Module is presented in English
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Department	Information Science
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Period of presentation	Semester 1
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Module content

*Closed - requires departmental selection.

Publishing in the Digital Environment. The first part of this module focuses on the study of publications in the digital environment. Differences between paper-based and digital texts are studied. Publication formats in the digital arena are discussed by focusing on topics such as multimedia, hyper fiction, e-books, etc., as well as distribution channels such as intranets and portals. The influence of the digital environment on publications and publication processes is the main focus of the second part, focusing on understanding the nature and management of the e-publishing environment and digital publishing technologies such as HTML, SGML, XML and PDF.

Publishing 311 (PUB 311)

Qualification	Undergraduate
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Module credits	30.00
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Programmes	BIS Publishing
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Prerequisites	No prerequisites.
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Contact time	3 lectures per week, 3 practicals per week
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Language of tuition	Module is presented in English
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Department	Information Science
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Period of presentation	Semester 1
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Module content

*Closed - requires department selection.

Commissioning. This module offers an introduction to the commissioning phase of the book publishing process. The process of manuscript commissioning is studied within the dual contexts of the South African publishing environment and the internal environment of the publishing house.

Topics covered include: market research; list building; the management of both the manuscript development and production phases; costing a project; scheduling and contracts. Learners demonstrate their understanding of commissioning through case studies, role-plays and the creation of a manuscript proposal.

Publishing 320 (PUB 320)

Qualification	Undergraduate
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Module credits	30.00
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Programmes	BIS Publishing
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Prerequisites	No prerequisites.
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Contact time	3 lectures per week, 3 practicals per week
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Language of tuition	Module is presented in English
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Department	Information Science
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Period of presentation	Semester 2
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Module content

*Closed – requires departmental selection.

Management in the Publishing Environment. This module offers an introduction to publishing as a business. Topics covered include business models in the publishing industry, the organisational structures of publishing houses, and the application of marketing in a publishing context.

Publishing 321 (PUB 321)

Qualification	Undergraduate
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Module credits	30.00
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Programmes	BIS Publishing
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Prerequisites	No prerequisites.
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Contact time	3 lectures per week, 3 practicals per week
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Language of tuition	Module is presented in English
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Department	Information Science
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Period of presentation	Semester 2
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Module content

*Closed - requires department selection.

Publishing in the Magazine and Corporate Environment. This module offers an introduction to the publishing value chain as applied to magazines and corporate publications; the magazine and corporate publishing environment (including kinds of magazines and corporate publications, readership, market segmentation); commissioning writing for magazines and corporate publications; production processes; sales and marketing; and distribution.

Advanced e-publishing 712 (PUB 712)

Qualification	Postgraduate
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Module credits	15.00
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Programmes	BISHons Publishing
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Service modules	Faculty of Economic and Management Sciences
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Prerequisites	No prerequisites.
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Contact time	3 discussion classes per week
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Language of tuition	Module is presented in English
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Department	Information Science
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Period of presentation	Semester 2
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Module content

The aim of this module is to further familiarise students with the development, economics and delivery of electronic publications. Students develop strong e-production skills through hands-on implementation of publication workflows for various electronic publications. Students also implement a business plan for the distribution and marketing of these publications.

Publishing management: Management and finance 722 (PUB 722)

Qualification	Postgraduate
Module credits	15.00
Programmes	BISHons Publishing
Prerequisites	No prerequisites.
Contact time	1 lecture per week
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Semester 1

Module content

This module focuses on the theory and practice of publishing management. Issues addressed include the following: personal skills; general management skills; financial skills; new product development; costing; editorial issues.

Publishing management: Organisation and processes 723 (PUB 723)

Qualification	Postgraduate
Module credits	15.00
Programmes	BISHons Publishing
Prerequisites	No prerequisites.
Contact time	1 lecture per week
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Semester 2

Module content

This module focuses on the theory and practice of publishing management. Issues addressed include the following: human resources; legal skills; project management; sales and marketing; communication skills; logistics; leadership.

Research project 1: The South African publishing environment 724 (PUB 724)

Qualification	Postgraduate
Module credits	15.00

Programmes	BISHons Publishing
Prerequisites	No prerequisites.
Contact time	1 lecture per week
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Semester 1

Module content

This module is research-based. The focus is on developments and trends impacting on the value chain and supply chain of the local book industry.
The overall objective of the module is to generate research that can contribute to information on the shape and size of this cultural industry.

Research project 2: The international publishing environment 725 (PUB 725)

Qualification	Postgraduate
Module credits	15.00
Programmes	BISHons Publishing
Prerequisites	No prerequisites.
Contact time	1 lecture per week
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Semester 2

Module content

This module is research-based. The focus is on global developments and trends impacting on book publishing as a cultural industry. The research parameters will be determined yearly by a selection of relevant global practices impacting on local developments and trends.

Editorial practice: Advanced copy-editing and editorial project management 728 (PUB 728)

Qualification	Postgraduate
Module credits	15.00
Programmes	BISHons Publishing
Prerequisites	No prerequisites.
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Semester 1 and Semester 2

Module content

One of the central role players in the publishing value chain is the copy-editor, whose tasks range from copy-editing and proofreading manuscripts, to developing budgets and schedules, and managing entire publishing projects through production. This module builds on students' knowledge of and skills in editorial practice, including advanced copyediting, editorial and production project management. The module also focuses on theory of editorial practice, including editorial approaches and policies.

Editorial practice: List building and acquisition of rights 729 (PUB 729)

Qualification	Postgraduate
Module credits	15.00
Programmes	BISHons Publishing
Prerequisites	No prerequisites.
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Semester 1 and Semester 2

Module content

At the heart of the publishing value chain lies the commissioning editor or publisher, whose tasks range from commissioning new titles and nurturing authors, through to managing entire publishing lists and making rights acquisitions. This module builds on students' knowledge of and skills in commissioning and acquisitions, with a particular focus on strategic and financial aspects of publishing list building, and acquisition policies and procedures.

Advanced electronic publishing 730 (PUB 730)

Qualification	Postgraduate
Module credits	15.00
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Semester 2

Module content

The aim of this module is to further familiarise students with the development, economics and delivery of electronic publications. Students develop strong e-production skills through hands-on implementation of publication workflows for various electronic publications. Students also implement a business plan for the distribution and marketing of these publications.

Trends in publishing 731 (PUB 731)

Qualification	Postgraduate
Module credits	15.00
Language of tuition	Module is presented in English

Department	Information Science
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Period of presentation	Semester 1
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Module content

This module is research-based. The focus is on developments and trends impacting on the value chain and supply chain of the local book industry.

The overall objective of the module is to generate research that can contribute to information on the shape and size of this cultural industry.

Book history 732 (PUB 732)

Qualification	Postgraduate
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Module credits	15.00
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Programmes	BISHons Publishing
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Prerequisites	No prerequisites.
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Contact time	2 lectures per week
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Language of tuition	Module is presented in English
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Department	Information Science
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Period of presentation	Semester 2
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Module content

This module provides an introduction to the history of the book, examining key themes of book production, distribution, authorship and reading. Attention is also given to the development of a textual and print culture in South Africa.

Publishing: Coursework component 801 (PUB 801)

Qualification	Postgraduate
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Module credits	120.00
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Prerequisites	No prerequisites.
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Contact time	4 discussion classes per week
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Language of tuition	Module is presented in English
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Department	Information Science
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Period of presentation	Year
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Dissertation: Publishing 890 (PUB 890)

Qualification	Postgraduate
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Module credits	180.00
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Programmes	MIS Publishing
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Prerequisites	No prerequisites.
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Language of tuition	Module is presented in English
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Department	Information Science
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Period of presentation	Year
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Module content

A comprehensive report on an aspect of Publishing.

Mini-dissertation: Publishing 895 (PUB 895)

Qualification	Postgraduate
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Module credits	120.00
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Prerequisites	No prerequisites.
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Language of tuition	Module is presented in English
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Department	Information Science
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Period of presentation	Year
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Thesis: Publishing 990 (PUB 990)

Qualification	Postgraduate
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Module credits	360.00
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Programmes	PhD Publishing
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Prerequisites	No prerequisites.
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Language of tuition	Module is presented in English
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Department	Information Science
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Period of presentation	Year
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Module content

A comprehensive and advanced report on an approved project. Expert, highly specialised and interdisciplinary research within Publishing.

Workshop practice 121 (PWP 121)

Qualification	Undergraduate
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Module credits	8.00
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Programmes	BEng Mining Engineering BEng Mining Engineering ENGAGE
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Prerequisites	No prerequisites.
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Contact time	1 other contact session per week
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Language of tuition	Module is presented in English
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Department	Mining Engineering
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Period of presentation	Semester 2
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Module content

*Attendance modules only

The modules are presented during the first year of study and, subject to departmental arrangements, can be attended either during July or December holiday periods. The duration will be a minimum of two weeks, during which time the student will receive training in a mine as well as a mine workshop. Training will include the following maintenance aspects: rotary and percussion drills, transport equipment, hoists and hoist ropes, electrical motors, conveyor belts and pumps. A satisfactory report must be submitted within two weeks after the commencement of lectures of the following semester.

Plant science 312 (PWT 312)

Qualification	Undergraduate
Module credits	8.00
Programmes	BSc Landscape Architecture
Prerequisites	LAN 212 and LAN 222
Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	Architecture
Period of presentation	Semester 1

Module content

Ecological principles for planting in reclamation and resettlement. Environmental legislation with reference to environmental management and monitoring.

Plant science 322 (PWT 322)

Qualification	Undergraduate
Module credits	8.00
Programmes	BSc Landscape Architecture
Prerequisites	PWT 312 GS
Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	Architecture
Period of presentation	Semester 2

Module content

Plant community studies and conservation within the context of urban open space; implications and management of weeds and invaders, red-data lists and rare and endangered species. Technical aspects regarding the establishment of plants and the maintenance thereof. Approaches to the establishment of planting in complex urban environments.

Dissertation: Mining engineering 890 (PYI 890)

Qualification	Postgraduate
Module credits	180.00
Programmes	MEng Mining Engineering
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Mining Engineering
Period of presentation	Year

Dissertation 891 (PYI 891)

Qualification	Postgraduate
Module credits	180.00
Programmes	MSc Applied Science Mining
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Mining Engineering
Period of presentation	Year

Project component (Capita selecta) 700 (RFP 700)

Qualification	Postgraduate
Module credits	60.00
Programmes	BScHons Applied Science Architecture
Prerequisites	No prerequisites.
Contact time	1 seminar per week
Language of tuition	Module is presented in English
Department	Architecture
Period of presentation	Year

Module content

A capita selecta of the various modules related to the research field that the student is advised to follow by the research field coordinator. Research fields:

- Environment potential
- Human settlements and urbanism
- Heritage and cultural landscapes

Research field project 710 (RFP 710)

Qualification	Postgraduate
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Module credits	16.00
Programmes	BArchHons
Prerequisites	No prerequisites.
Contact time	7 practicals per week
Language of tuition	Module is presented in English
Department	Architecture
Period of presentation	Consult the department

Research field project 711 (RFP 711)

Qualification	Postgraduate
Module credits	16.00
Programmes	BArchHons
Prerequisites	No prerequisites.
Contact time	7 practicals per week
Language of tuition	Module is presented in English
Department	Architecture
Period of presentation	Consult the department

Research field project 712 (RFP 712)

Qualification	Postgraduate
Module credits	16.00
Programmes	BLArchHons
Prerequisites	No prerequisites.
Contact time	7 practicals per week
Language of tuition	Module is presented in English
Department	Architecture
Period of presentation	Consult the department

Research field project 713 (RFP 713)

Qualification	Postgraduate
Module credits	16.00
Programmes	BIntArchHons
Prerequisites	No prerequisites.
Contact time	7 practicals per week
Language of tuition	Module is presented in English

Department	Architecture
Period of presentation	Consult the department

Research field project 720 (RFP 720)

Qualification	Postgraduate
Module credits	16.00
Programmes	BLArchHons
Prerequisites	No prerequisites.
Contact time	7 practicals per week
Language of tuition	Module is presented in English
Department	Architecture
Period of presentation	Consult the department

Research field project 721 (RFP 721)

Qualification	Postgraduate
Module credits	16.00
Programmes	BArchHons
Prerequisites	No prerequisites.
Contact time	7 practicals per week
Language of tuition	Module is presented in English
Department	Architecture
Period of presentation	Consult the department

Research field project 722 (RFP 722)

Qualification	Postgraduate
Module credits	16.00
Programmes	BLArchHons
Prerequisites	No prerequisites.
Contact time	7 practicals per week
Language of tuition	Module is presented in English
Department	Architecture
Period of presentation	Consult the department

Research field project 723 (RFP 723)

Qualification	Postgraduate
Module credits	16.00

Programmes	BIntArchHons
Prerequisites	No prerequisites.
Contact time	7 practicals per week
Language of tuition	Module is presented in English
Department	Architecture
Period of presentation	Consult the department

Research field project 730 (RFP 730)

Qualification	Postgraduate
Module credits	16.00
Programmes	BIntArchHons
Prerequisites	No prerequisites.
Contact time	7 practicals per week
Language of tuition	Module is presented in English
Department	Architecture
Period of presentation	Consult the department

Research field project 731 (RFP 731)

Qualification	Postgraduate
Module credits	16.00
Programmes	BArchHons
Prerequisites	No prerequisites.
Contact time	7 practicals per week
Language of tuition	Module is presented in English
Department	Architecture
Period of presentation	Consult the department

Research field project 732 (RFP 732)

Qualification	Postgraduate
Module credits	16.00
Programmes	BLArchHons
Prerequisites	No prerequisites.
Contact time	7 practicals per week
Language of tuition	Module is presented in English
Department	Architecture

Period of presentation	Consult the department
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Research field project 733 (RFP 733)

Qualification	Postgraduate
Module credits	16.00
Programmes	BIntArchHons
Prerequisites	No prerequisites.
Contact time	7 practicals per week
Language of tuition	Module is presented in English
Department	Architecture
Period of presentation	Consult the department

Research project 740 (RFP 740)

Qualification	Postgraduate
Module credits	20.00
Prerequisites	No prerequisites.
Contact time	7 practicals per week
Language of tuition	Module is presented in English
Department	Architecture
Period of presentation	Quarter 4

Research project 741 (RFP 741)

Qualification	Postgraduate
Module credits	20.00
Prerequisites	No prerequisites.
Contact time	4 practicals per week
Language of tuition	Module is presented in English
Department	Architecture
Period of presentation	Semester 2

Research project 742 (RFP 742)

Qualification	Postgraduate
Module credits	20.00
Prerequisites	No prerequisites.
Contact time	4 practicals per week
Language of tuition	Module is presented in English

Department	Architecture
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Period of presentation	Semester 2
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Research project 743 (RFP 743)

Qualification	Postgraduate
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Module credits	20.00
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Prerequisites	No prerequisites.
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Contact time	10 lectures per week
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Language of tuition	Module is presented in English
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Department	Architecture
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Period of presentation	Quarter 1
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Research project 750 (RFP 750)

Qualification	Postgraduate
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Module credits	20.00
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Prerequisites	No prerequisites.
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Contact time	7 practicals per week
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Language of tuition	Module is presented in English
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Department	Architecture
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Period of presentation	Quarter 4
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Theory component (Capita selecta) 700 (RFS 700)

Qualification	Postgraduate
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Module credits	30.00
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Programmes	BScHons Applied Science Architecture
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Prerequisites	No prerequisites.
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Contact time	1 discussion class per week, 2 lectures per week
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Language of tuition	Module is presented in English
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Department	Architecture
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Period of presentation	Year
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Module content

A capita selecta from one of the following departmental research fields:

- Environment potential
- Human settlements and urbanism
- Heritage and cultural landscapes

Research field studies 710 (RFS 710)

Qualification	Postgraduate
Module credits	32.00
Programmes	BArchHons
Prerequisites	No prerequisites.
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Architecture
Period of presentation	Year

Research field studies 720 (RFS 720)

Qualification	Postgraduate
Module credits	32.00
Programmes	BLArchHons
Prerequisites	No prerequisites.
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Architecture
Period of presentation	Year

Research field studies 730 (RFS 730)

Qualification	Postgraduate
Module credits	32.00
Programmes	BIntArchHons
Prerequisites	No prerequisites.
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Architecture
Period of presentation	Year

Theory component 740 (RFS 740)

Qualification	Postgraduate
Module credits	8.00
Prerequisites	No prerequisites.
Contact time	2 lectures per week

Language of tuition	Module is presented in English
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Department	Architecture
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Period of presentation	Consult the department
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Research field studies 890 (RFS 890)

Qualification	Postgraduate
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Module credits	35.00
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Programmes	MSc Applied Science Architecture (Coursework)
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Prerequisites	No prerequisites.
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Contact time	2 lectures per week, 2 seminars per week
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Language of tuition	Module is presented in English
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Department	Architecture
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Period of presentation	Year
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Computer science 800 (RKW 800)

Qualification	Postgraduate
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Module credits	120.00
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Prerequisites	No prerequisites.
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Language of tuition	Module is presented in English
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Department	Computer Science
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Period of presentation	Year
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Dissertation: Computer science 890 (RKW 890)

Qualification	Postgraduate
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Module credits	180.00
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Programmes	MSc Computer Science
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Prerequisites	No prerequisites.
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Language of tuition	Module is presented in English
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Department	Computer Science
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Period of presentation	Year
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Thesis: Computer science 990 (RKW 990)

Qualification	Postgraduate
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Module credits	360.00
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Programmes	PhD Computer Science
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Prerequisites	No prerequisites.
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Language of tuition	Module is presented in English
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Department	Computer Science
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Period of presentation	Year
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Civil building materials 321 (SBM 321)

Qualification	Undergraduate
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Module credits	16.00
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Programmes	BEng Civil Engineering BEng Civil Engineering ENGAGE
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Prerequisites	SGM 221
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Contact time	1 tutorial per week, 2 practicals per week, 3 lectures per week
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Language of tuition	Separate classes for Afrikaans and English
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Department	Civil Engineering
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Period of presentation	Semester 2
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Module content

The behaviour, properties and application of cement and concrete products, structural steel, fibre reinforcing, polymers, masonry work and bituminous materials.

Civil engineering measurement techniques 321 (SBZ 321)

Qualification	Undergraduate
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Module credits	8.00
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Programmes	BEng Civil Engineering BEng Civil Engineering ENGAGE
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Prerequisites	(SWK 210)
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Contact time	1 practical per week, 1 tutorial per week, 2 lectures per week
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Language of tuition	Module is presented in English
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Department	Civil Engineering
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Period of presentation	Semester 1
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Module content

Measurement instruments and measurement techniques used in engineering applications. Theory of the Wheatstone bridge and the application of strain gauges to measurement instruments. Accuracy, precision, resolution, hysteresis and linearity. Mechanical, hydraulic and electrical measurement instruments including load cells, pressure sensors, displacement transducers, vibration sensors, stress cells and inclinometers. Use of Arduino micro controller to read, log and plot sensor data. Elementary site survey and levelling. Coordinate systems and global positioning systems. Civil engineering monitoring programmes including planning, execution, data interpretation and reporting.

Civil engineering construction management 420 (SBZ 420)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Civil Engineering BEng Civil Engineering ENGAGE
Prerequisites	(SVC 412)
Contact time	1 practical per week, 1 tutorial per week, 4 lectures per week
Language of tuition	Module is presented in English
Department	Civil Engineering
Period of presentation	Semester 2

Module content

Planning, needs assessment and performance indicators for contracts. Civil Engineering Project: client, consultant and contractors expectations and responsibilities. Tender process, construction process, application of OHS Act and Mine, Health and Safety Act, conditions of contract and claims, insurances, engineering economics, programming, costing, 1509001: quality management systems, life cycle concepts, maintenance cycle, maintenance management.

Computer applications in civil engineering 420 (SCA 420)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Civil Engineering BEng Civil Engineering ENGAGE
Prerequisites	(SHC 410), (SIN 411), (SIN 413), (SGM 323), (SVC 412)
Contact time	2 practicals per week, 2 tutorials per week, 3 lectures per week
Language of tuition	Separate classes for Afrikaans and English
Department	Civil Engineering
Period of presentation	Semester 2

Module content

In this module commercially available computer packages will be used to develop models based on Finite Elements, Finite Differences and other approaches. Limitations and simple checks to ensure consistency of commonly used design software packages will be illustrated. Basic principles and techniques will be discussed and the effect of aspects such as meshing, element choice, boundary conditions and material properties will be investigated. Applications within the various fields of Civil Engineering will be considered. Results obtained from models will be compared to actual experimental results. This module will contain groupwork and multi-disciplinary problems will be solved.

Exploring the universe 154 (SCI 154)

Qualification	Undergraduate
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Module credits	16.00
Programmes	BSc Computer Science
Prerequisites	Prohibited combination SCI 164
Contact time	4 lectures per week
Language of tuition	Module is presented in English
Department	Physics
Period of presentation	Semester 1

Module content

Students from all faculties are welcome to join us in our exploration of the universe from an earth-bound perspective. We reflect on the whole universe from the sub microscopic to the vast macroscopic and mankind's modest position therein. To what degree is our happiness determined by stars? Echoes from ancient firmaments - the astronomy of old civilisations. The universe is born with a bang. Stars, milky ways and planets are formed. Life is breathed into the landscape on earth, but is there life elsewhere? The architecture of the universe - distance measurements, structure of our solar system and systems of stars. How does it look like on neighbouring planets? Comets and meteorites. Life cycles of stars. Spectacular exploding stars! Exotica like pulsars and black holes.

Detailed design 420 (SDO 420)

Qualification	Undergraduate
Module credits	24.00
Programmes	BEng Civil Engineering BEng Civil Engineering ENGAGE
Prerequisites	(SHC 410), (SIN 411), (SIN 413), (SGM 323), (SVC 412)
Contact time	1 practical per week, 1 tutorial per week, 5 lectures per week
Language of tuition	Separate classes for Afrikaans and English
Department	Civil Engineering
Period of presentation	Semester 2

Module content

The module focuses on design applications. The student is exposed to the application of the classic disciplines of structures, geotechnical, hydraulics and transportation in detail design. Supervisors select the most valuable application in each discipline. Typical examples include the following:

- Structures: Multi storey buildings with reinforced concrete frames and slabs
- Hydraulics: Pump lines and stations
- Geotechnical: Slimes dams
- Transportation: Traffic impact studies, pavement design and analysis

The applications selected for each discipline may vary from year to year.

Introduction to Sepedi grammar - Capita Selecta 111 (SEP 111)

Qualification	Undergraduate
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Module credits	12.00
Programmes	BA BA Extended programme BA Languages BA Law BEd Foundation Phase Teaching BEd Intermediate Phase Teaching BEd Senior Phase and Further Education and Training Teaching BIS Publishing
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education
Prerequisites	No prerequisites.
Contact time	2 lectures per week
Language of tuition	Module is presented in Sepedi
Department	African Languages
Period of presentation	Semester 1

Module content

*For speakers of Sepedi as home language or first or second additional language.

Aspects of the grammar of Sepedi such as an introduction to the word categories; an introduction to the structure, meaning and use of the noun, the adjective, the relative, the possessive; the verb; writing and spelling rules; dictionaries and dictionary use; grammatical analysis.

Sepedi grammar - Capita selecta 211 (SEP 211)

Qualification	Undergraduate
Module credits	20.00
Programmes	BA BA Languages BA Law BEd Foundation Phase Teaching BEd Intermediate Phase Teaching BEd Senior Phase and Further Education and Training Teaching BIS Publishing BPolSci Political Studies
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education
Prerequisites	SEP 111, AFT 121
Contact time	2 lectures per week
Language of tuition	Module is presented in Sepedi
Department	African Languages
Period of presentation	Semester 1

Module content

Aspects of the grammar of Sepedi such as a continuation of the study of the word categories; grammatical analysis; the structure, meaning and use of the pronoun and the enumerative; an introduction to Sepedi speech sounds/phonetics.

Sepedi 310 (SEP 310)

Qualification	Undergraduate
Module credits	30.00
Programmes	BA BA Languages BA Law BEd Senior Phase and Further Education and Training Teaching BIS Publishing BPolSci Political Studies
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education
Prerequisites	SEP 210, SEP 220 will be required for students who completed SEP 110, SEP 120 at year level 1 and SEP 211, AFT 220 will be required for students who completed SEP 111, AFT 121 at year level 1
Contact time	1 discussion class per week, 2 lectures per week
Language of tuition	Module is presented in English and Sepedi
Department	African Languages
Period of presentation	Semester 1

Module content

Sepedi grammar - Capita selecta

Aspects of the grammar of Sepedi such as a continuation of the study of the word categories; grammatical analysis; more intensive study of the structure, meaning and use of the noun (specifically derived nouns) and verb (specifically moods and verbal extensions); an introduction to the sound changes / phonology of Sepedi. The acquisition and inculcation of advanced communicative skills within a larger number of social, occupational and educational situations. Awareness of the nature and function of language structures is heightened further. Attention is also paid to cultural phenomena.

Civil environmental management 421 (SEV 421)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Civil Engineering BEng Civil Engineering ENGAGE
Prerequisites	No prerequisites.
Contact time	1 practical per week, 1 tutorial per week, 4 lectures per week
Language of tuition	Separate classes for Afrikaans and English

Department	Civil Engineering
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Period of presentation	Semester 2
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Module content

Regulatory framework, site investigation, site restoration, and waste disposal. Site characterization methods. Waste types and properties. Integrated environmental management processes. Environmental legislation in South Africa. Environmental impact, environmental auditing and risk analysis. ISO 140000: what it entails and how it is applied. Community participation. Municipal service delivery life cycles. Environmental management in context of project lifecycle. Project life cycle management and project management. SHEQ in the workplace

Pavement design 793 (SGC 793)

Qualification	Postgraduate
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Module credits	24.00
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Programmes	BEngHons Transportation Engineering BScHons Applied Science Transportation Planning
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Prerequisites	No prerequisites.
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Contact time	40 Contact hours
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Language of tuition	Module is presented in English
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Department	Civil Engineering
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Period of presentation	Year
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Module content

A research term paper will be prepared.

Design philosophy in First and Third World environments; characterising and use of pavement materials; drainage; systems approach to layout, geometric and pavement design; stresses and strains in pavements; mechanistic design methods and elasto-plastic behaviour; economic analysis; designing pavements for streets, gravel and paved roads, runways, and industrial areas. Report writing.

Concrete technology 794 (SGC 794)

Qualification	Postgraduate
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Module credits	24.00
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Programmes	BEngHons Structural Engineering BEngHons Transportation Engineering BEngHons Water Resources Engineering
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Prerequisites	No prerequisites.
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Contact time	40 Contact hours
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Language of tuition	Module is presented in English
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Department	Civil Engineering
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Period of presentation	Year
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Module content

A research term paper will be prepared.

Properties of concrete and concrete mixes. Characteristics of Portland cement and supplementary cementitious materials. Aggregates, admixtures and practical design of mixes. Manufacture, curing and testing, including non-destructive methods. Statistical approach to quality control. Time-dependent behaviour and durability of concrete. The principles for appropriate selection of materials and techniques for repair, maintenance and strengthening of civil engineering structures. Investigation and diagnosis. Corrosion of reinforcement. Alkali-aggregate reaction, sulphate attack. Physical degradation. Repair materials. Protective systems. Systems for repair.

Road rehabilitation technology 797 (SGC 797)

Qualification	Postgraduate
Module credits	24.00
Programmes	BEngHons Transportation Engineering
Prerequisites	No prerequisites.
Contact time	40 Contact hours
Language of tuition	Module is presented in English
Department	Civil Engineering
Period of presentation	Year

Module content

A research term paper will be prepared.

Development of road management systems and application to existing street and road networks. Evaluation of, and measurements on existing facilities. Maintenance management. Recycling of materials. Design methods for upgrading, re-construction and strengthening of the existing road infrastructure. Prerequisite: Pavement Design SGC 793.

Dissertation 890 (SGI 890)

Qualification	Postgraduate
Module credits	180.00
Programmes	MEng Geotechnical Engineering
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Civil Engineering
Period of presentation	Year

Pavement materials and design 221 (SGM 221)

Qualification	Undergraduate
Module credits	16.00

Programmes	BEng Civil Engineering BEng Civil Engineering ENGAGE
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Prerequisites	GLY 256 GS
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Contact time	1 practical per week, 1 tutorial per week, 3 lectures per week
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Language of tuition	Module is presented in English
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Department	Civil Engineering
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Period of presentation	Semester 2
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Module content

Geological origin. Soil tests and classification systems. Compaction, stabilisation. Bitumen and tar. Introduction to pavements. Overview of road building materials. Pavement design principles and methods.

Soil mechanics 311 (SGM 311)

Qualification	Undergraduate
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Module credits	16.00
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Programmes	BEng Civil Engineering BEng Civil Engineering ENGAGE BSc Engineering and Environmental Geology BSc Geology
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Service modules	Faculty of Natural and Agricultural Sciences
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Prerequisites	(SWK 210)
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Contact time	1 practical per week, 2 tutorials per week, 3 lectures per week
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Language of tuition	Separate classes for Afrikaans and English
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Department	Civil Engineering
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Period of presentation	Semester 1
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Module content

Introduction to soil mechanics. Introduction to clay mineralogy. Mass, volume relationships and phases of soil. Groundwater flow and permeability. Effective stress principles. Suction pressures in saturated as well as partially saturated soil. The Mohr circle and stresses at a point. The Mohr-Coulomb strength theory and the stress-strain properties of soil. The Boussinesq theory. Consolidation theory and soil settlement.

Geotechnical engineering 323 (SGM 323)

Qualification	Undergraduate
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Module credits	16.00
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Programmes	BEng Civil Engineering BEng Civil Engineering ENGAGE BSc Engineering and Environmental Geology
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Prerequisites	(SGM 311)
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Contact time	1 practical per week, 2 discussion classes per week, 3 lectures per week
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Language of tuition	Separate classes for Afrikaans and English
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Department	Civil Engineering
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Period of presentation	Semester 2
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Module content

Application of consolidation theory. Bearing capacity of soil and foundation design, Terzaghi and general methods. Horizontal stresses in soil and design of retaining structures, Rankine and Couloumb's methods. Slope stability including Bishop's method of slices. Introduction to site investigation.

Basic soil mechanics 785 (SGM 785)

Qualification	Postgraduate
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Module credits	24.00
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Prerequisites	No prerequisites.
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Contact time	20 Contact hours
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Language of tuition	Module is presented in English
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Department	Civil Engineering
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Period of presentation	Year
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Module content

Introduction to soil mechanics, classification of soil characteristics, seepage and permeability, stress and strain in saturated and partially saturated soils, Mohr's circle applications.

Basic pavements and transportation 787 (SGM 787)

Qualification	Postgraduate
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Module credits	24.00
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Programmes	BScHons Applied Science Transportation Planning
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Prerequisites	No prerequisites.
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Contact time	40 Contact hours
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Language of tuition	Module is presented in English
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Department	Civil Engineering
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Period of presentation	Year
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Module content

Pavements: The geological cycle and origin of road building materials, soil testing and classification systems, compaction, stabilization, bitumen, introduction to pavements, principles of pavement design and management. Transportation: Introduction to traffic analysis techniques, capacity and level of service concepts, traffic signal design, road geometric design, transport demand models and road safety engineering.

Advanced geotechnical design 780 (SGS 780)

Qualification	Postgraduate
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Module credits	8.00
Prerequisites	No prerequisites.
Contact time	10 lectures per week
Language of tuition	Module is presented in English
Department	Civil Engineering
Period of presentation	Semester 1 or Semester 2

Geotechnical laboratory testing 785 (SGS 785)

Qualification	Postgraduate
Module credits	24.00
Prerequisites	No prerequisites.
Contact time	20 contact hours per semester
Language of tuition	Module is presented in English
Department	Civil Engineering
Period of presentation	Year

In situ soil testing and monitoring 786 (SGS 786)

Qualification	Postgraduate
Module credits	24.00
Prerequisites	No prerequisites.
Contact time	40 contact hours per semester
Language of tuition	Module is presented in English
Department	Civil Engineering
Period of presentation	Year

Analytical soil mechanics 787 (SGS 787)

Qualification	Postgraduate
Module credits	24.00
Programmes	BEngHons Geotechnical Engineering BScHons Applied Science Geotechnics
Prerequisites	No prerequisites.
Contact time	20 Contact hours
Language of tuition	Module is presented in English
Department	Civil Engineering
Period of presentation	Year

Module content

A research term paper will be prepared.

Solution of confined and unconfined seepage problems using the methods of fragments, finite differences and finite elements. Numerical solutions of consolidation problems and secondary compression. Slope stability analysis methods. The point estimate method. Monte Carlo simulation.

Theoretical soil mechanics 788 (SGS 788)

Qualification	Postgraduate
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Module credits	24.00
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Programmes	BEngHons Geotechnical Engineering BScHons Applied Science Geotechnics
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Prerequisites	No prerequisites.
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Contact time	20 Contact hours
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Language of tuition	Module is presented in English
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Department	Civil Engineering
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Period of presentation	Year
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Module content

A research term paper will be prepared.

Introduction to critical state soil mechanics. Stress and strain invariants. Stress paths. State boundary surfaces including Roscoe and Hvorslev surfaces. Cam clay model. Application of geotechnical constitutive models in finite element analysis.

Specialised geotechnical testing 789 (SGS 789)

Qualification	Postgraduate
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Module credits	24.00
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Programmes	BEngHons Geotechnical Engineering BScHons Applied Science Geotechnics
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Prerequisites	No prerequisites.
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Contact time	32 Contact hours
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Language of tuition	Module is presented in English
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Department	Civil Engineering
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Period of presentation	Year
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Module content

A research term paper will be prepared.

Test procedures and interpretation of; Standard Penetration Test (SPT), Cone Penetration Test (CPT), Piezocone (CPTU) and seismic methods. Theory, application and interpretation of advanced geotechnical laboratory tests. Laboratory Instrumentation and calibration. Stress and strain conditions for laboratory tests. Triaxial stress space, stress paths. Triaxial tests, direct shear tests, oedometer test and Rowe cell test.

Hydraulics 310 (SHC 310)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Civil Engineering BEng Civil Engineering ENGAGE
Prerequisites	(SWK 210)
Contact time	1 discussion class per week, 1 practical per week, 4 lectures per week
Language of tuition	Afrikaans and English are used in one class
Department	Civil Engineering
Period of presentation	Semester 1

Module content

Fluid properties and fundamental principles of applied hydrostatic, hydrostatic forces on bodies, buoyancy and stability of bodies. Kinematics, flow rate measurement and velocity determination. Pipe flow and real fluids. Basic principles of water purification and water treatment.

Hydraulics 321 (SHC 321)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Civil Engineering BEng Civil Engineering ENGAGE
Prerequisites	(SHC 310)
Contact time	1 practical per week, 1 tutorial per week, 4 lectures per week
Language of tuition	Afrikaans and English are used in one class
Department	Civil Engineering
Period of presentation	Semester 2

Module content

Pipe network analyses and municipal services. Components of water distribution networks. Pump selection and water hammer analyses. Free surface flows and model analyses.

Hydraulics 410 (SHC 410)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Civil Engineering BEng Civil Engineering ENGAGE
Prerequisites	(SHC 310), SHC 321GS
Contact time	1 practical per week, 1 tutorial per week, 4 lectures per week
Language of tuition	Separate classes for Afrikaans and English

Department	Civil Engineering
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Period of presentation	Semester 1
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Module content

Sediment transportation, hydraulic structures, bridges and culvert hydraulics, stormwater handling. Hydrology, flood hydrology, creation of runoff records and the simulation of surface water resources, creation of stochastic sequences and the reliability analysis of surface water resources.

Flood hydrology 792 (SHC 792)

Qualification	Postgraduate
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Module credits	24.00
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Programmes	BEngHons Water Resources Engineering BScHons Applied Science Water Resources
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Prerequisites	No prerequisites.
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Contact time	32 Contact hours
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Language of tuition	Module is presented in English
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Department	Civil Engineering
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Period of presentation	Year
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Module content

A research term paper will be prepared.

This course entails the calculation of design flows for different return periods, using the statistical, deterministic – and empirical methods. Dambreak analysis is included in this course as well as channel and level pool routing.

Hydraulic design 793 (SHC 793)

Qualification	Postgraduate
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Module credits	24.00
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Prerequisites	No prerequisites.
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Contact time	32 Contact hours
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Language of tuition	Module is presented in English
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Department	Civil Engineering
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Period of presentation	Year
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Module content

A research term paper will be prepared.

This course covers the hydraulic aspects associated with the design of hydraulic structures for dams, road drainage, and other conveyance systems. The hydraulic considerations for the selection and design of energy dissipation structures are assessed in this course.

Free surface flow 794 (SHC 794)

Qualification	Postgraduate
Module credits	24.00
Prerequisites	No prerequisites.
Contact time	32 Contact hours
Language of tuition	Module is presented in English
Department	Civil Engineering
Period of presentation	Year

Module content

A research term paper will be prepared.

This course entails the calculation of design flows for different return periods, using the statistical, deterministic – and empirical methods. Dambreak analysis is included in this course as well as channel and level pool routing.

Pipe flow 795 (SHC 795)

Qualification	Postgraduate
Module credits	24.00
Programmes	BEngHons Water Resources Engineering BScHons Applied Science Water Resources
Prerequisites	No prerequisites.
Contact time	40 Contact hours
Language of tuition	Module is presented in English
Department	Civil Engineering
Period of presentation	Year

Module content

A research term paper will be prepared.

The focus in this course will be on the practical aspects of pipeline design. The theoretical background to pipeline hydraulics will be covered and practical examples will be assessed. The following specific aspects such as pipeline hydraulics included dynamic pressures, pipeline component selection and design, pipeline installation and the testing and operation of pipelines will be covered in this course.

Water resource analysis and management 796 (SHC 796)

Qualification	Postgraduate
Module credits	24.00
Prerequisites	No prerequisites.
Contact time	32 Contact hours
Language of tuition	Module is presented in English

Department	Civil Engineering
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Period of presentation	Year
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Module content

A research term paper will be prepared.

In this course students will be familiarized with the background and procedures used in the creation of flow records and the use of the WRSM2005 model. Surface water systems will be analysed and gross yields will be determined. In the second part of the course the theory and procedures required for the yield determination of surface water resources will be discussed.

Basic statistical methods 797 (SHC 797)

Qualification	Postgraduate
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Module credits	24.00
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Programmes	BScHons Applied Science Geotechnics BScHons Applied Science Transportation Planning
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Prerequisites	No prerequisites.
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Contact time	40 Contact hours
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Language of tuition	Module is presented in English
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Department	Civil Engineering
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Period of presentation	Year
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Module content

Basic mathematical methods. Algebra. Matrices and matrix algebra. Series expansions. Differentiation and integration. Probability theory. Graphic analysis. Discrete and continuous probability distributions. Moments and expectation. Statistical sampling and experimental design. Parameter estimation. Confidence intervals. Hypothesis testing. Regression analysis.

Applied statistical methods and optimisation 798 (SHC 798)

Qualification	Postgraduate
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Module credits	24.00
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Programmes	BEngHons Geotechnical Engineering BEngHons Transportation Engineering BEngHons Water Resources Engineering
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Prerequisites	No prerequisites.
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Contact time	40 Contact hours
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Language of tuition	Module is presented in English
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Department	Civil Engineering
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Period of presentation	Year
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Module content

A research term paper will be prepared.

The course will apply some of the basics theories and methodologies in statistics and operations research to solve common civil engineering problems. The course seeks to demonstrate the use and application in the civil engineering field. Each of the applications seeks to determine how best to design and operate a system, usually under conditions requiring the allocation of scarce resources. Emphasis will be on the applications of these methods in common civil engineering practice. Some of the applications will include; optimum network design, maximum flow problem, project scheduling, queuing theory, probabilistic analysis, Markov chain applications, etc.

Advanced hydrology 886 (SHC 886)

Qualification	Postgraduate
Module credits	32.00
Prerequisites	No prerequisites.
Contact time	10 lectures per week
Language of tuition	Module is presented in English
Department	Civil Engineering
Period of presentation	Semester 1 or Semester 2

Pump systems 785 (SHW 785)

Qualification	Postgraduate
Module credits	24.00
Prerequisites	No prerequisites.
Contact time	32 Contact hours
Language of tuition	Module is presented in English
Department	Civil Engineering
Period of presentation	Year

Module content

A research term paper will be prepared.

Basic hydraulics 788 (SHW 788)

Qualification	Postgraduate
Module credits	24.00
Prerequisites	No prerequisites.
Contact time	28 Contact hours
Language of tuition	Module is presented in English
Department	Civil Engineering

Period of presentation Year

Module content

This course covers the basic hydraulic principles and their application. Themes covered include: fluid characteristics, fluid kinematics, pipe flow, pipe networks, introduction to pumps and pump stations, free surface flow, flow measurement, hydraulic assessment of hydraulic structures, storm water drainage and culvert systems and flood hydrology.

Timber design 310 (SIB 310)

Qualification Undergraduate

Module credits 8.00

Programmes [BEng Civil Engineering](#)
[BEng Civil Engineering ENGAGE](#)

Prerequisites SIN 223 GS

Contact time 1 tutorial per week, 2 lectures per week

Language of tuition Separate classes for Afrikaans and English

Department Civil Engineering

Period of presentation Semester 1

Module content

Self-weight, imposed and wind loads. Principles of limit-states design. Timber as a structural material, design of tension, compression and bending members (laterally braced and unbraced), beam columns, trusses and bracing.

Basic structural analysis 790 (SIC 790)

Qualification Postgraduate

Module credits 24.00

Prerequisites No prerequisites.

Contact time 40 Contact hours

Language of tuition Module is presented in English

Department Civil Engineering

Period of presentation Year

Module content

Virtual work and influence lines, analysis of statically indeterminate structures (two and three-dimensional), slope-deflection, superposition, stiffness and flexibility methods, matrix and computer methods, plastic analysis of portal frames.

Basic structural design 793 (SIC 793)

Qualification Postgraduate

Module credits 24.00

Prerequisites	No prerequisites.
Contact time	40 Contact hours
Language of tuition	Module is presented in English
Department	Civil Engineering
Period of presentation	Year

Module content

This course comprises two sections: reinforced concrete design and structural steel design. Reinforced concrete design covers the design of beams; behaviour and design of slabs; design of slender columns and columns subjected to bi-axial bending; design of simple and combined footings; staircase design; and an introduction to prestressed concrete. Structural steel design covers the characteristics of steel; design of structural steel members including elements in bending, and bending combined with tension and compression; design of portal frames; composite construction and the bending resistance of composite sections; and plastic design.

Civil engineering economics 310 (SIE 310)

Qualification	Undergraduate
Module credits	8.00
Programmes	BEng Civil Engineering BEng Civil Engineering ENGAGE
Prerequisites	No prerequisites.
Contact time	2 lectures per week, 2 other contact sessions per week
Language of tuition	Module is presented in English
Department	Civil Engineering
Period of presentation	Semester 1

Module content

Introduction to engineering economics: Basic guidelines, assessment of alternative investment possibilities. Equal annual cash flow, current value, internal rate of return, cost benefit relationship. Economic evaluation of projects: Influence of depreciation on the economics of projects, determination of income tax implications of decisions, economic analysis of multiple alternatives, the influence of inflation on the economics of projects, application of the theory of probability for economics studies, economic studies on the replacement of equipment.

Numerical methods and finite element applications for Civil Engineers 790 (SIK 790)

Qualification	Postgraduate
Module credits	24.00
Programmes	BEngHons Geotechnical Engineering BEngHons Structural Engineering BEngHons Transportation Engineering BEngHons Water Resources Engineering

Contact time	40 contact hours
Language of tuition	Module is presented in English
Department	Civil Engineering
Period of presentation	Year

Module content

In the first part of this course, numerical procedures and some underlying theory for solving systems of equations, eigenvalue problems, integration, approximation and boundary value problems will be discussed. The second part of the course covers general finite element theory, discretization aspects related to geometry, nodes and numbering, element type and shape, interpolation functions, formulation of element characteristic matrices and vectors for elasticity problems, assembly and solution of the finite element equations, modelling procedures and results processing. The student will use Finite Element software to apply the theory that was covered in the course for solving typical Civil Engineering problems.

Structural analysis 223 (SIN 223)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Civil Engineering BEng Civil Engineering ENGAGE
Prerequisites	WTW 161, WTW 168 and SWK 210
Contact time	1 tutorial per week, 2 practicals per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Civil Engineering
Period of presentation	Semester 2

Module content

Statically indeterminate beams. Virtual work. Analysis of statically indeterminate structures using the methods of super-position, slope-deflection and moment distribution (with sway and support displacement).

Structural analysis 311 (SIN 311)

Qualification	Undergraduate
Module credits	8.00
Programmes	BEng Civil Engineering BEng Civil Engineering ENGAGE
Prerequisites	SIN 223
Contact time	1 practical per week, 1 tutorial per week, 2 lectures per week
Language of tuition	Separate classes for Afrikaans and English
Department	Civil Engineering
Period of presentation	Semester 1

Module content

Analysis of symmetrical structures using slope-deflection equations or moment-distribution; three dimensional structures and grillages; matrix methods; influence lines. Euler buckling of columns with different boundary conditions.

Steel design 323 (SIN 323)

Qualification	Undergraduate
Module credits	8.00
Programmes	BEng Civil Engineering BEng Civil Engineering ENGAGE
Prerequisites	SIN 311 GS
Contact time	1 practical per week, 1 tutorial per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Civil Engineering
Period of presentation	Semester 2

Module content

Stability of beams. Material properties. Analysis and limit states design of tension, compression and flexural members, and beam-columns. Design of trusses, simple framed structures and connections.

Reinforced concrete design 324 (SIN 324)

Qualification	Undergraduate
Module credits	8.00
Programmes	BEng Civil Engineering BEng Civil Engineering ENGAGE
Prerequisites	SIN 311 GS
Contact time	1 practical per week, 1 tutorial per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Civil Engineering
Period of presentation	Semester 2

Module content

Properties of reinforced concrete. Principles of limit states design. Analysis and design of sections in flexure and in compression combined with flexure. Design for shear and torsion. Bond and anchorage. Serviceability requirements: Detailing and span-effective depth ratios. Design of footings and short columns. Simple footings and stairs.

Steel design 411 (SIN 411)

Qualification	Undergraduate
Module credits	8.00

Programmes	BEng Civil Engineering BEng Civil Engineering ENGAGE
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Prerequisites	(SIN 323)
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Contact time	1 practical per week, 1 tutorial per week, 2 lectures per week
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Language of tuition	Module is presented in English
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Department	Civil Engineering
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Period of presentation	Semester 1
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Module content

Analysis and design composite steel beam and concrete slab construction, Moment connections, Elastic and plastic design of portal, industrial and building structures.

Reinforced concrete design 413 (SIN 413)

Qualification	Undergraduate
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Module credits	8.00
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Programmes	BEng Civil Engineering BEng Civil Engineering ENGAGE
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Prerequisites	(SIN 324)
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Contact time	1 practical per week, 1 tutorial per week, 2 lectures per week
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Language of tuition	Module is presented in English
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Department	Civil Engineering
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Period of presentation	Semester 1
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Module content

Behaviour and design of beams, slabs (solid, ribbed and waffle slabs, flat plates and flat slabs), columns (slender columns and biaxial bending), footings (simple and combined footings) and stairs. Introduction to the design of prestressed concrete flexural members.

Structural steel 415 (SIN 415)

Qualification	Undergraduate
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Module credits	16.00
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Prerequisites	(SIN 323) (SIN 325)
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Language of tuition	Separate classes for Afrikaans and English
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Department	Civil Engineering
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Period of presentation	Semester 1
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Module content

Stability of beams. Material properties. Analysis and limit states design of tension, compression and flexural members, and beam-columns. Design of trusses, simple framed structures and connections. Analysis and design composite steel beam and concrete slab construction, Moment connections, Elastic and plastic design of portal, industrial and building structures.

Steel design 776 (SIN 776)

Qualification	Postgraduate
Module credits	24.00
Prerequisites	No prerequisites.
Contact time	40 Contact hours
Language of tuition	Module is presented in English
Department	Civil Engineering
Period of presentation	Year

Module content

A research term paper will be prepared.

Introduction to structural reliability, tension elements, buckling of plates in compression elements, compression elements, beams and plate girders, plastic analysis and design of structures and structural elements, connections, composite design and steel-framed structures.

Structural mechanics 777 (SIN 777)

Qualification	Postgraduate
Module credits	24.00
Programmes	BEngHons Structural Engineering BScHons Applied Science Structure
Prerequisites	No prerequisites.
Contact time	40 Contact hours
Language of tuition	Module is presented in English
Department	Civil Engineering
Period of presentation	Year

Module content

A research term paper will be prepared.

Continuum mechanics. Classical and numerical (finite difference and finite element) solutions for plane and plate structures. Plasticity and failure criteria. Elastic stability. Non-linear analysis.

Reinforced concrete design 778 (SIN 778)

Qualification	Postgraduate
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Module credits	24.00
Prerequisites	No prerequisites.
Contact time	40 Contact hours
Language of tuition	Module is presented in English
Department	Civil Engineering
Period of presentation	Year

Module content

A research term paper will be prepared.

Material properties. Behaviour and analysis of reinforced concrete members for flexure, axial loads, flexure plus axial load and shear. Cracking and deflection (short- and long-term) of flexural members. Plasticity in flexural members. Braced and unbraced slender columns.

Timber design 779 (SIN 779)

Qualification	Postgraduate
Module credits	24.00
Prerequisites	No prerequisites.
Contact time	40 Contact hours
Language of tuition	Module is presented in English
Department	Civil Engineering
Period of presentation	Year

Module content

A research term paper will be prepared.

Timber properties, grading, treatment, structural form, element design and bracing of structures. Analysis of I-beams, composite beams, frames and connections. Research project.

Structural design (Special) 788 (SIN 788)

Qualification	Postgraduate
Module credits	16.00
Prerequisites	No prerequisites.
Contact time	1 other contact session per week
Language of tuition	Module is presented in English
Department	Civil Engineering
Period of presentation	Semester 1

Structural analysis 790 (SIN 790)

Qualification	Postgraduate
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Module credits	24.00
Prerequisites	No prerequisites.
Contact time	40 Contact hours
Language of tuition	Module is presented in English
Department	Civil Engineering
Period of presentation	Year

Module content

A research term paper will be prepared.

Stiffness and flexibility methods for plane, grid and three-dimensional structures. In-plane stability of beam-columns and frames; effective lengths and lateral torsional instability of beams. Dynamics: free and forced, undamped and damped framed systems and mass matrices and natural frequencies.

Pre-stressed concrete design 791 (SIN 791)

Qualification	Postgraduate
Module credits	24.00
Programmes	BEngHons Structural Engineering BScHons Applied Science Structure
Prerequisites	No prerequisites.
Contact time	40 Contact hours
Language of tuition	Module is presented in English
Department	Civil Engineering
Period of presentation	Year

Module content

A research term paper will be prepared.

Material properties; prestressing systems; flexural design; losses; effects of continuity; shear; deflections; anchorage; cracking; prestressed concrete slabs and detailing.

Dissertation: Structural engineering 890 (SIN 890)

Qualification	Postgraduate
Module credits	180.00
Programmes	MEng Structural Engineering
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Civil Engineering
Period of presentation	Year

Mini-dissertation 896 (SIN 896)

Qualification	Postgraduate
Module credits	64.00
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Civil Engineering
Period of presentation	Year

Thesis: Civil engineering 990 (SIR 990)

Qualification	Postgraduate
Module credits	360.00
Programmes	PhD Civil PhD Civil Engineering
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Civil Engineering
Period of presentation	Year

Industry-based learning 400 (SIT 400)

Qualification	Undergraduate
Module credits	52.00
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Informatics
Period of presentation	Semester 2

Industry-based learning 700 (SIT 700)

Qualification	Postgraduate
Module credits	52.00
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	School of Information Technology
Period of presentation	Semester 2

Thesis: Information technology 990 (SIT 990)

Qualification	Postgraduate
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Module credits	360.00
Programmes	PhD Information Technology
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Informatics
Period of presentation	Year

Module content

Please note: All PhD students first register for SIT 990. As soon as a supervisor has been assigned the student will be moved to the assigned module of the corresponding department. Informatics students will remain registered for SIT 990.

Thesis: Information technology 991 (SIT 991)

Qualification	Postgraduate
Module credits	360.00
Programmes	PhD Information Technology
Language of tuition	Module is presented in English
Department	Information Science
Period of presentation	Year

Module content

Please note: Only for the Department of Information Science students.

Thesis: Information technology 992 (SIT 992)

Qualification	Postgraduate
Module credits	360.00
Programmes	PhD Information Technology
Language of tuition	Module is presented in English
Department	Computer Science
Period of presentation	Year

Module content

Please note: Only for Department of Computer Science students.

Professional and technical communication 210 (SJJ 210)

Qualification	Undergraduate
Module credits	8.00
Prerequisites	No prerequisites.
Contact time	2 lectures per week, 2 other contact sessions per week

Language of tuition	Module is presented in English
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Department	Civil Engineering
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Period of presentation	Semester 1
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Module content

Communicate effectively, both orally and in writing, with engineering audiences and the community at large. Written communication as evidenced by: uses appropriate structure, use of modern or electronic communication methods; style and language for purpose and audience; uses effective graphical support; applies methods of providing information for use by others involved in engineering activity; meets the requirements of the target audience. Effective oral communication as evidenced by appropriate structure, style and language; appropriate visual materials; delivers fluently; meets the requirements of the intended audience. Audiences range from engineering peers, management and lay persons, using appropriate academic or professional discourse. Typed reports range from short (300-1 000 word plus tables diagrams) to long (10 000-15 000 words plus tables, diagrams, references and appendices), covering material at exit level. Methods of providing information include the conventional methods of the discipline, for example engineering drawings, as well as subject-specific methods.

Professional and technical communication 310 (SJJ 310)

Qualification	Undergraduate
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Module credits	8.00
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Programmes	BEng Civil Engineering BEng Civil Engineering ENGAGE
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Prerequisites	No prerequisites.
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Contact time	2 lectures per week, 2 other contact sessions per week
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Language of tuition	Module is presented in English
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Department	Civil Engineering
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Period of presentation	Semester 1
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Module content

Communicate effectively, both orally and in writing, with engineering audiences and the community at large. Written communication as evidenced by: uses appropriate structure, use of modern or electronic communication methods; style and language for purpose and audience; uses effective graphical support; applies methods of providing information for use by others involved in engineering activity; meets the requirements of the target audience. Effective oral communication as evidenced by appropriate structure, style and language; appropriate visual materials; delivers fluently; meets the requirements of the intended audience. Audiences range from engineering peers, management and lay persons, using appropriate academic or professional discourse. Typed reports range from short (300-1 000 word plus tables diagrams) to long (10 000-15 000 words plus tables, diagrams, references and appendices), covering material at exit level. Methods of providing information include the conventional methods of the discipline, for example engineering drawings, as well as subject-specific methods.

Construction contract law 811 (SKB 811)

Qualification	Postgraduate
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Module credits	10.00
Prerequisites	No prerequisites.
Contact time	20 contact hours per semester
Language of tuition	Module is presented in English
Department	Construction Economics
Period of presentation	Semester 1

Introduction to structures 110 (SKE 110)

Qualification	Undergraduate
Module credits	8.00
Programmes	BSc Construction Management BSc Quantity Surveying
Prerequisites	No prerequisites.
Contact time	1 discussion class per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Civil Engineering
Period of presentation	Semester 1

Module content

Design; basics (forces, moments, equilibrium, reactions, stress, strain); materials; loads; pin-jointed trusses; tension members.

Structures 120 (SKE 120)

Qualification	Undergraduate
Module credits	8.00
Programmes	BSc Construction Management BSc Quantity Surveying
Prerequisites	SKE 110
Contact time	1 tutorial per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Civil Engineering
Period of presentation	Semester 2

Module content

Beams (shear force and bending moment, bending and shear stresses, design of standard beams in steel, concrete and timber, section properties, lateral restraint); compression members; combined axial and bending; deflection.

Reinforced concrete structures 210 (SKE 210)

Qualification	Undergraduate
Module credits	9.00
Prerequisites	SKE 120 GS
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Civil Engineering
Period of presentation	Semester 1

Module content

Properties of reinforced concrete; construction methods; slabs; beams; columns; foundations; retaining walls; placement of reinforcement in the various structural members; basic concepts of prestressed concrete.

Civil engineering services 220 (SKE 220)

Qualification	Undergraduate
Module credits	8.00
Programmes	BSc Construction Management BSc Quantity Surveying BSc Real Estate
Prerequisites	No prerequisites.
Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	Civil Engineering
Period of presentation	Semester 2

Module content

Water reticulation; sewerage reticulation; stormwater reticulation; roads.

Psychology 110 (SLK 110)

Qualification	Undergraduate
Module credits	12.00

Programmes	BA
	BA Audiology
	BA Extended programme
	BA Fine Arts
	BA Languages
	BA Law
	BA Speech-Language Pathology
	BEEd Senior Phase and Further Education and Training Teaching
	BIS Information Science
	BNurs
	BOccTher
	BPhysio
	BSW
	BSc Extended programme - Biological and Agricultural Sciences
	BSc Human Physiology, Genetics and Psychology

Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Health Sciences Faculty of Natural and Agricultural Sciences
Prerequisites	No prerequisites.
Contact time	2 discussion classes per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Psychology
Period of presentation	Semester 1

Module content

This module is a general orientation to Psychology. An introduction is given to various theoretical approaches in Psychology, and the development of Psychology as a science is discussed. Selected themes from everyday life are explored and integrated with psychological principles. This module focuses on major personality theories. An introduction is given to various paradigmatic approaches in Psychology.

Psychology 120 (SLK 120)

Qualification	Undergraduate
Module credits	12.00

Programmes	BA
	BA Audiology
	BA Extended programme
	BA Fine Arts
	BA Languages
	BA Law
	BA Speech-Language Pathology
	BEd Senior Phase and Further Education and Training Teaching
	BIS Information Science
	BOccTher
Programmes	BSW
	BSc Extended programme - Biological and Agricultural Sciences
	BSc Human Physiology, Genetics and Psychology

Service modules	Faculty of Engineering, Built Environment and Information Technology
	Faculty of Education
	Faculty of Health Sciences
	Faculty of Natural and Agricultural Sciences
Prerequisites	No prerequisites.
Contact time	2 discussion classes per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Psychology
Period of presentation	Semester 2

Module content

This module introduces the student to a basic knowledge and understanding of the biological basis of human behaviour. The module addresses the key concepts and terminology related to the biological subsystem, the rules and principles guiding biological psychology, and identification of the interrelatedness of different biological systems and subsystems. In this module various cognitive processes are studied, including perception, memory, thinking, intelligence and creativity. Illustrations are given of various thinking processes, such as problem solving, critical, analytic and integrative thinking.

Psychology 210 (SLK 210)

Qualification	Undergraduate
Module credits	20.00
Programmes	BA
	BA Audiology
	BA Languages
	BA Law
	BA Speech-Language Pathology
	BOccTher
	BPhysio
	BSW
Programmes	BSc Human Physiology, Genetics and Psychology

Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Health Sciences Faculty of Natural and Agricultural Sciences
Prerequisites	SLK 110, SLK 120(GS)
Contact time	2 discussion classes per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Psychology
Period of presentation	Semester 1

Module content

In this module human development from conception through adolescence to adulthood is discussed with reference to various psychological theories. Incorporated are the developmental changes related to cognitive, physical, emotional and social functioning of the individual and the context of work in adulthood. Traditional and contemporary theories of human development explaining and describing these stages are studied in order to address the key issues related to both childhood and adulthood.

Psychology 220 (SLK 220)

Qualification	Undergraduate
Module credits	20.00
Programmes	BA BA Audiology BA Languages BA Law BA Speech-Language Pathology BSW BSc Human Physiology, Genetics and Psychology

Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Health Sciences Faculty of Natural and Agricultural Sciences
Prerequisites	SLK 110, SLK 120(GS) and (RES 210 recommended)
Contact time	2 discussion classes per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Psychology
Period of presentation	Semester 2

Module content

This module is a social-psychological perspective on interpersonal and group processes. Themes that are covered include communication, pro-social behaviour, social influence and persuasion, political transformation, violence, and group behaviour.

Psychology 310 (SLK 310)

Qualification	Undergraduate
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Module credits	30.00
Programmes	BA BA Audiology BA Law BA Speech-Language Pathology BSW BSc Human Physiology, Genetics and Psychology
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Natural and Agricultural Sciences
Prerequisites	SLK 210(GS), SLK 220(GS)
Contact time	2 discussion classes per week, 2 lectures per week
Language of tuition	Separate classes for Afrikaans and English
Department	Psychology
Period of presentation	Semester 1

Module content

Identification of abnormal behaviour in children based on knowledge of normal childhood development; introduction to the study of various models pertaining to abnormal behaviour; understanding and application of basic concepts in child psychopathology. This module also provides an introduction to psychopathology and symptomatology of adult abnormal behaviour. Terminology, definitions of abnormal behaviour, problems in diagnosis, labelling, and myths regarding abnormal behaviour are discussed. Neurosis as a specific mental disorder is studied critically from a multidimensional perspective, including intrapsychic, interpersonal and social-cultural explanations.

Psychology 320 (SLK 320)

Qualification	Undergraduate
Module credits	30.00
Programmes	BA BA Law BSW
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Natural and Agricultural Sciences
Prerequisites	SLK 210 GS, SLK 220 GS, (RES 320 recommended)
Contact time	2 discussion classes per week, 2 lectures per week
Language of tuition	Separate classes for Afrikaans and English
Department	Psychology
Period of presentation	Semester 2

Module content

This module deals with a community psychological perspective on human behaviour and psychological interventions and also critically explores the contribution of various perspectives in psychology. The module focuses on themes such as definitions of key concepts, principles and aims of community psychology, and the role of the community psychologist as well as the impact of earlier thought frameworks on contemporary perspectives. The implications of these ideas for practical initiatives focussed on mental health in communities, are discussed. The module further focuses on critical psychology. Critical psychology is an orientation towards psychology that is critical towards the assumptions and practices of psychology as it is practiced in the mainstream. It attempts to address power issues as they manifest in the practice of mainstream psychology. The focus is on examining how the practice and theories of mainstream psychology contribute to these power issues impacting on marginalised groups.

Sociology 110 (SOC 110)

Qualification	Undergraduate
Module credits	12.00
Programmes	BA BA Extended programme BA Languages BA Law BIS Information Science BPolSci International Studies BPolSci Political Studies BSW BSocSci Industrial Sociology and Labour Studies BTRP LLB
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Law
Prerequisites	No prerequisites.
Contact time	1 tutorial per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Sociology
Period of presentation	Semester 1

Module content

Invitation to Sociology

How do we understand ourselves as individuals in relation to society? How are our individual life courses and large-scale processes of social and historical change related to each other? How have our societies come to be what they are today? And how can we think of our private troubles as public issues? These questions are at the very heart of sociology as a distinctive way of thinking about and understanding the social worlds that we inhabit. This module invites students to become familiar with sociological ways of thinking about current issues and personal experiences (particularly in the southern African context), and to develop the analytical skills that are necessary in order to ask and answer critical questions about the communities, society, and world that they live in. The module will include a specific emphasis on academic reading skills.

Sociology 120 (SOC 120)

Qualification	Undergraduate
Module credits	12.00
Programmes	BA BA Extended programme BA Languages BA Law BIS Information Science BPolSci International Studies BPolSci Political Studies BSW BSocSci Industrial Sociology and Labour Studies BTRP LLB
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Law
Prerequisites	No prerequisites.
Contact time	1 tutorial per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Sociology
Period of presentation	Semester 2

Module content

Thinking sociologically

Drawing from the idea of Sociology as a discipline that focuses on critical thinking, the module will introduce students to ways of questioning the obvious and the taken-for-granted. In particular, power and inequality will be problematised, with a focus on how power operates to structure racial, class and gender inequalities across institutions, ideologies and identities. The module will introduce students to the operations of power as manifested in the production of institutions, the proliferation of identities and heightened contestations among ideologies. The module will include a specific emphasis on writing skills.

Sociology 210 (SOC 210)

Qualification	Undergraduate
Module credits	20.00
Programmes	BA BA Languages BA Law BPolSci International Studies BPolSci Political Studies BSW BSocSci Industrial Sociology and Labour Studies BTRP
Service modules	Faculty of Engineering, Built Environment and Information Technology

Prerequisites	SOC 110(GS), SOC 120(GS)
Contact time	1 tutorial per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Sociology
Period of presentation	Semester 1

Module content

Industrial sociology

This module addresses sociological approaches to the workplace. Its focus is on theories of work and the current themes and debates within the sociology of work with an emphasis on exploring these issues from a southern perspective. Some of the themes that will be covered include the theorisation and conceptualisation of work, work in industrialising societies, workplace restructuring and reorganisation, flexibility in the labour market, changing technologies and the implications for work and employment, and new forms of work (including atypical work, service work, emotional labour, professional work).

Sociology 220 (SOC 220)

Qualification Undergraduate

Module credits 20.00

Programmes

[BA](#)
[BA Languages](#)
[BA Law](#)
[BPolSci International Studies](#)
[BPolSci Political Studies](#)
[BSW](#)
[BSocSci Industrial Sociology and Labour Studies](#)
[BTRP](#)

Service modules Faculty of Engineering, Built Environment and Information Technology

Prerequisites SOC 110, SOC 120(GS)

Contact time 1 tutorial per week, 3 lectures per week

Language of tuition Module is presented in English

Department Sociology

Period of presentation Semester 2

Module content

Culture and religion in the construction of identities: Gender, sexuality and race

The global proliferation of identities is explored through the lens of social categories of difference. The convergence of ideologies and institutions in the construction of identities at the intersections of gender, sexuality and race is examined with a particular emphasis on modern African identities, drawing on the sub-disciplines of the sociology of religion and cultural sociology.

Sociology 221 (SOC 221)

Qualification Undergraduate

Module credits	20.00
Programmes	BTRP
Prerequisites	SOC 110(GS), SOC 120(GS)
Contact time	1 tutorial per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Sociology
Period of presentation	Semester 2

Module content

Demography, health and society

This module will use intersectional and critical lenses to provide students with a broad understanding of how demographic and social factors affect population health and medical care across a range of contexts. The main theoretical underpinnings and debates, as well as basic measures of each construct will be covered to operationalise the constructs for the purposes of practical application in sociological research and understanding. The focus will be comparative, both across time and between developed and less developed societies in general and South African societies in particular.

Sociology 310 (SOC 310)

Qualification	Undergraduate
Module credits	30.00
Programmes	BA BA Law BPolSci International Studies BPolSci Political Studies BSW BSocSci Industrial Sociology and Labour Studies BTRP
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	SOC 120, SOC 210(GS), SOC 220(GS)
Contact time	1 tutorial per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Sociology
Period of presentation	Semester 1

Module content

Structure, agency and power in social theory

How do we theorise the interrelationships between structure, agency, and power in society? This is the central question in this module, which provides students with an intensive introduction to critical social theories.

Engaging with current affairs and debates in society, the module will enable students to learn how to develop theoretical knowledge about the ways in which power is structured and exercised in society – both from above and below, as well as across fields (the economic, the political, the cultural) and scales (the body, private and public spheres, communities and nation-states, and the world-system).

Sociology 321 (SOC 321)

Qualification	Undergraduate
Module credits	30.00
Programmes	BTRP
Prerequisites	SOC 210(GS) or SOC 211(GS) and SOC 220(GS) or SOC 221(GS)
Contact time	1 tutorial per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Sociology
Period of presentation	Semester 2

Module content

Thinking methodologically

This module sets out to introduce students to ‘doing research’. In this respect the assumptions and processes underpinning methodological choices in sociological research are considered in order to think about foundations of research, about how knowledge claims are made, how science is conceptualised, what role theory plays, as well as how values and ethics shape the politics of research. In addition to these foundational questions, a broad introduction to methods used in social research is provided by considering both the theoretical dimensions and practical application of various research tools. The purpose of the module is to equip students with the necessary competence to, describe ontological and epistemological debates and different approaches to research in the social sciences, delineate a research problem, identify units of analysis, make sampling decisions and formulate questions and hypothesis as well as understand the principles of quantitative (elementary statistical decision-making) and qualitative data analysis.

Practical training 410 (SPY 410)

Qualification	Undergraduate
Module credits	16.00
Programmes	BEng Civil Engineering BEng Civil Engineering ENGAGE
Prerequisites	No prerequisites.
Contact time	1 other contact session per week
Language of tuition	Separate classes for Afrikaans and English

Department	Civil Engineering
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Period of presentation	Semester 1
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Module content

*Attendance module only

During or at the end of the third year of study, students in civil engineering undergo at least 6 weeks of prescribed training in the industry. A satisfactory report on the practical training must be submitted to the Student Administration within one week of registration.

Dissertation: Town and regional planning 890 (SSB 890)

Qualification	Postgraduate
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Module credits	180.00
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Programmes	MTRP
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Prerequisites	No prerequisites.
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Language of tuition	Module is presented in English
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Department	Town and Regional Planning
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Period of presentation	Year
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Thesis: Town and regional planning 990 (SSB 990)

Qualification	Postgraduate
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Module credits	360.00
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Programmes	PhD Town and Regional Planning
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Prerequisites	No prerequisites.
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Language of tuition	Module is presented in English
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Department	Town and Regional Planning
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Period of presentation	Year
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Research project 412 (SSC 412)

Qualification	Undergraduate
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Module credits	30.00
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Programmes	BEng Civil Engineering BEng Civil Engineering ENGAGE
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Prerequisites	(SHC 321) (SIN 323) (SIN 324) (SGM 323) (SBM 321) (SVC 323)
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Contact time	2 tutorials per week, 6 practicals per week
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Language of tuition	Separate classes for Afrikaans and English
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Department	Civil Engineering
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Period of presentation	Semester 1
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Module content

In the first semester, two full days of the week must be used by final-year students for the execution of an analytical and/or experimental research project.

Civil research 780 (SSC 780)

Qualification	Postgraduate
Module credits	32.00
Programmes	BEngHons Geotechnical Engineering BEngHons Structural Engineering BEngHons Transportation Engineering BEngHons Water Resources Engineering BScHons Applied Science Geotechnics BScHons Applied Science Structure BScHons Applied Science Transportation Planning BScHons Applied Science Water Resources
Contact time	8 contact hours per year
Language of tuition	Module is presented in English
Department	Civil Engineering
Period of presentation	Year

Module content

*This is a compulsory module.

The course will require all honours students to conduct research in an appropriate field of civil engineering, linked to the main discipline in which the student specializes for their honours degree.

Mini-dissertation 890 (SSC 890)

Qualification	Postgraduate
Module credits	64.00
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Civil Engineering
Period of presentation	Year

Mini-dissertation: Transportation engineering 898 (SSC 898)

Qualification	Postgraduate
Module credits	16.00
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Civil Engineering
Period of presentation	Year

Infrastructure management 790 (SSI 790)

Qualification	Postgraduate
Module credits	24.00
Programmes	BEngHons Structural Engineering BEngHons Transportation Engineering BEngHons Water Resources Engineering BScHons Applied Science Structure BScHons Applied Science Transportation Planning BScHons Applied Science Water Resources
Prerequisites	No prerequisites.
Contact time	40 Contact hours
Language of tuition	Module is presented in English
Department	Civil Engineering
Period of presentation	Year

Module content

A research term paper will be prepared.

This module will cover the following topics: Asset Management principles, Maintenance Management principles, Maintenance strategies and philosophies, Condition based Maintenance, Reliability Centred Maintenance (RCM), Resource Management, Maintenance Management Systems, Total Productive Maintenance (TPM) and Risk Management. Maintenance management of the following disciplines will be studied in detail: Road infrastructure, Railway infrastructure, Airport infrastructure, Buildings and other structures, Water resources and water supply.

Guided special studies 882 (SSI 882)

Qualification	Postgraduate
Module credits	32.00
Prerequisites	No prerequisites.
Contact time	10 lectures per week
Language of tuition	Module is presented in English
Department	Civil Engineering
Period of presentation	Semester 1

Dissertation 890 (SST 890)

Qualification	Postgraduate
Module credits	180.00
Programmes	MSc Applied Science Geotechnics MSc Applied Science Structures MSc Applied Science Transportation Planning MSc Applied Science Water Resources
Prerequisites	No prerequisites.

Language of tuition	Module is presented in English
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Department	Civil Engineering
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Period of presentation	Year
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Mini-dissertation 896 (SST 896)

Qualification	Postgraduate
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Module credits	64.00
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Prerequisites	No prerequisites.
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Language of tuition	Module is presented in English
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Department	Civil Engineering
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Period of presentation	Semester 1
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Statistics 122 (STC 122)

Qualification	Undergraduate
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Module credits	13.00
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Programmes	BIT Information Systems
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Prerequisites	At least a 60% in STK 110 or an average of 60% for either (1) WST 133, WST 143, WST 153; (2) STK 113, STK 123, STK 121; (3) STK 133, STK 134, STK121; (4) WST 133, WST 143, STK 121 (An aegrotat exam is available to students who obtained 50%-59%)
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Contact time	1 practical per week, 1 tutorial per week, 3 lectures per week
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Language of tuition	Module is presented in English
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Department	Statistics
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Period of presentation	Semester 2
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Module content

Inferential concepts. Experimental and observational data. Measures of association, uncertainty and goodness of fit. Sampling error and accuracy of estimation. Introduction to linear regression, reduction of variation due to regression. Conditional distributions of residuals. Simulation based inference: conditional means and prediction intervals. Bivariate data visualisation. Supporting mathematical concepts. Statistical concepts are demonstrated and interpreted through practical coding and simulation within a data science framework.

This module is also presented as a summer school for students who initially elected and passed STK 120 with a final mark of at least 60% and then decides to further their studies in statistics as well as for students who achieved a final mark of between 40% - 49% in STC 122 during semester 2.

Statistics 110 (STK 110)

Qualification	Undergraduate
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Module credits	13.00
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Programmes

BA
BAdmin Public Management and International Relations
BCom
BCom Accounting Sciences
BCom Agribusiness Management
BCom Business Management
BCom Economics
BCom Financial Sciences
BCom Human Resource Management
BCom Informatics Information Systems
BCom Investment Management
BCom Law
BCom Marketing Management
BCom Statistics
BCom Statistics and Data Science
BCom Supply Chain Management
BConSci Clothing Retail Management
BConSci Food Retail Management
BConSci Hospitality Management
BIT Information Systems
BSc Computer Science
BSc Construction Management
BSc Geoinformatics
BSc Information and Knowledge Systems
BSc Quantity Surveying
BSc Real Estate
BScAgric Agricultural Economics and Agribusiness Management
BSocSci Philosophy, Politics and Economics
BTRP

Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Humanities Faculty of Natural and Agricultural Sciences
Prerequisites	At least 5 (60-69%) in Mathematics in the Grade 12 examination. Candidates who do not qualify for STK 110 must register for STK 113 and STK 123
Contact time	1 practical per week, 1 tutorial per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Statistics
Period of presentation	Semester 1

Module content

Descriptive statistics:

Sampling and the collection of data; frequency distributions and graphical representations. Descriptive measures of location and dispersion.

Probability and inference:

Introductory probability theory and theoretical distributions. Sampling distributions. Estimation theory and hypothesis testing of sampling averages and proportions (one and two-sample cases). Supporting mathematical concepts. Statistical concepts are demonstrated and interpreted through practical coding and simulation within a data science framework.

Statistics 120 (STK 120)

Qualification Undergraduate

Module credits 13.00

Programmes

BA
BAdmin Public Management and International Relations
BCom
BCom Business Management
BCom Economics
BCom Financial Sciences
BCom Human Resource Management
BCom Informatics Information Systems
BCom Law
BCom Marketing Management
BCom Statistics
BCom Supply Chain Management
BSc Computer Science
BSc Geoinformatics
BSc Information and Knowledge Systems
BTRP

Service modules

Faculty of Engineering, Built Environment and Information Technology
Faculty of Humanities
Faculty of Natural and Agricultural Sciences

Prerequisites

STK 110 GS or both STK 113 GS and STK 123 GS or both WST 133 and WST 143 or STK 133 and STK 143

Contact time

1 practical per week, 1 tutorial per week, 3 lectures per week

Language of tuition

Module is presented in English

Department

Statistics

Period of presentation

Semester 2

Module content

Students can only get credit for one of the following two modules: STK 120 or STK 121.

Analysis of variance, categorical data analysis, distribution-free methods, curve fitting, regression and correlation, the analysis of time series and indices. Statistical and economic applications of quantitative techniques: Systems of linear equations: solving and application. Optimisation, linear functions, non-linear functions. Marginal and total functions. Stochastic and deterministic variables in statistical and economic context: producers' and consumers' surplus. Supporting mathematical concepts. Statistical concepts are illustrated using simulation within a data science framework.

This module is also presented as STK 121, an anti-semester module. This is a terminating module.

Statistics 161 (STK 161)

Qualification	Undergraduate
Module credits	6.00
Programmes	BSc Construction Management BSc Quantity Surveying BSc Real Estate
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	STK 110 GS or both STK 113 GS and STK 123 GS
Contact time	1 practical per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Statistics
Period of presentation	Quarter 2 and 3

Module content

Students can only get credit for one of the following modules: STK 120 or STK 121 or STK 161.

Analysis of variance, categorical data analysis, distribution-free methods, curve fitting, regression and correlation, the analysis of time series and indices. Supporting mathematical concepts. Statistical concepts are illustrated using simulation within a data science framework.

This module is also presented as an anti-semester (quarter 2) module. This is a terminating module.

Statistics 210 (STK 210)

Qualification	Undergraduate
Module credits	20.00

Programmes	BCom
	BCom Agribusiness Management
	BCom Economics
	BCom Informatics Information Systems
	BCom Investment Management
	BCom Law
	BCom Statistics
	BCom Statistics and Data Science
	BIT Information Systems
	BSc Information and Knowledge Systems
	BScAgric Agricultural Economics and Agribusiness Management
	BSocSci Philosophy, Politics and Economics
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Humanities Faculty of Natural and Agricultural Sciences
Prerequisites	STK 110, STC 122 or WST 111, WST 121
Contact time	1 practical per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Statistics
Period of presentation	Semester 1

Module content

Statistical problem solving. Causality, experimental and observational data. Probability theory. Multivariate random variables. Discrete and continuous probability distributions. Stochastic representations. Measures of association. Expected values and conditional expectation. Simulation techniques. Supporting mathematical concepts. Statistical concepts are demonstrated and interpreted through practical coding and simulation within a data science framework.

Statistics 220 (STK 220)

Qualification Undergraduate

Module credits 20.00

Programmes	BCom
	BCom Agribusiness Management
	BCom Economics
	BCom Informatics Information Systems
	BCom Investment Management
	BCom Law
	BCom Statistics
	BCom Statistics and Data Science
	BIT Information Systems
	BSc Information and Knowledge Systems
	BScAgric Agricultural Economics and Agribusiness Management
	BSocSci Philosophy, Politics and Economics

Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Humanities Faculty of Natural and Agricultural Sciences
Prerequisites	STK 210 GS
Contact time	1 practical per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Statistics
Period of presentation	Semester 2

Module content

Multivariate probability distributions. Sampling distributions and the central limit theorem. Frequentist and Bayesian inference. Statistical learning and decision theory. Simulation techniques enhancing statistical thinking. Supervised learning: linear regression, estimation and inference. Non-parametric modelling. Supporting mathematical concepts. Statistical algorithms. Statistical concepts are demonstrated and interpreted through practical coding and simulation within a data science framework.

Statistics 310 (STK 310)

Qualification	Undergraduate
Module credits	25.00

Programmes

- [BCom](#)
- [BCom Economics](#)
- [BCom Informatics Information Systems](#)
- [BCom Investment Management](#)
- [BCom Law](#)
- [BCom Statistics](#)
- [BCom Statistics and Data Science](#)
- [BIT Information Systems](#)
- [BScAgric Agricultural Economics and Agribusiness Management](#)

Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Humanities Faculty of Natural and Agricultural Sciences
Prerequisites	STK 210, STK 220
Contact time	1 practical per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Statistics
Period of presentation	Semester 1

Module content

Supervised learning. Linear and non-linear regression. Ordinary least squares and maximum likelihood estimation. Violations of the assumptions, residual analysis. Cross validation. Statistical inference. Bootstrap inference. Supporting mathematical concepts. Statistical concepts are demonstrated and interpreted through practical coding and simulation within a data science framework.

Statistics 320 (STK 320)

Qualification	Undergraduate
Module credits	25.00
Programmes	BCom BCom Economics BCom Informatics Information Systems BCom Investment Management BCom Law BCom Statistics BCom Statistics and Data Science BSc Mathematical Statistics BScAgric Agricultural Economics and Agribusiness Management
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Economic and Management Sciences Faculty of Natural and Agricultural Sciences
Prerequisites	STK 210, STK 220 or WST 211, WST 221
Contact time	1 practical per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Statistics
Period of presentation	Semester 2

Module content

Stationary and non-stationary univariate time series. Properties of ARIMA processes. Identification, estimation and diagnostic testing of a time series models. Forecasting. Multivariate time series. Supervised learning: introduction to generalised linear models. Modelling of binary response variables, logistic regression. Supporting mathematical concepts. Statistical concepts are demonstrated and interpreted through practical coding and simulation within a data science framework.

The science of data analytics 353 (STK 353)

Qualification	Undergraduate
Module credits	25.00
Programmes	BIT Information Systems BSc Computer Science
Service modules	Faculty of Natural and Agricultural Sciences
Prerequisites	STK 210, STK 220, WST 212 or WST 211, WST 221, WST 212
Contact time	1 practical per week, 3 lectures per week
Language of tuition	Module is presented in English
Department	Statistics
Period of presentation	Semester 2

Module content

Data exploration. Data wrangling. Statistical coding. Algorithmic thinking. Sampling: basic techniques in probability, non-probability, and resampling methods. Text mining and analytics. Machine learning: classification and clustering. Statistical concepts are demonstrated and interpreted through practical coding and simulation within a data science framework.

Statistics elective 801 (STK 801)

Qualification	Postgraduate
Module credits	5.00
Programmes	MIT Big Data Science (Coursework)
Prerequisites	As determined by the Department of Statistics.
Contact time	5 contact hours
Language of tuition	Module is presented in English
Department	Statistics
Period of presentation	Semester 2

Module content

Five 5 credits of an elective course can be drawn from the Department of Statistics. In addition to study-leader approval, elective course selection may be subject to course pre-requisites, course availability, and internal departmental regulations as decided by the Head of the Department.

Statistics elective 802 (STK 802)

Qualification	Postgraduate
Module credits	5.00
Programmes	MIT Big Data Science (Coursework)
Prerequisites	As determined by the Department of Statistics.
Contact time	5 contact hours
Language of tuition	Module is presented in English
Department	Statistics
Period of presentation	Semester 2

Module content

Five 5 credits of an elective course can be drawn from the Department of Statistics. In addition to study-leader approval, elective course selection may be subject to course pre-requisites, course availability, and internal departmental regulations as decided by the Head of the Department.

Theory of structures 123 (STU 123)

Qualification	Undergraduate
Module credits	6.00

Prerequisites	No prerequisites.
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Architecture
Period of presentation	Semester 2

Module content

Introduction to the theory of structures: forces, moments, stresses, strains and structural components.

Theory of structures 211 (STU 211)

Qualification	Undergraduate
Module credits	8.00
Programmes	BSc Architecture
Prerequisites	No prerequisites.
Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	Civil Engineering
Period of presentation	Semester 1

Module content

Introduction to structural engineering concepts like design, analysis, sizing and planning of structures. Introduction to Newton's laws, equilibrium, free body diagrams. The application of equilibrium in solving reactions of statically determinate structures. The principles of determinacy and stability of structures. The application of Newton's laws in determining the internal forces in common structural systems like cable structures, trusses, frames and beams. The fundamental principles of weight and forces and how forces are transmitted through structural members and load tracing.

Theory of structures 221 (STU 221)

Qualification	Undergraduate
Module credits	8.00
Programmes	BSc Architecture
Prerequisites	STU 211 GS
Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	Civil Engineering
Period of presentation	Semester 2

Module content

Introduction to material science in structural engineering. Concepts like stress, strain, elasticity, stress-strain diagrams, elasticity modules, strength and deformation as applied in structural engineering. Cross-sectional properties of structural elements. Types of stresses, and their transmission in structural elements. Introduction to the relationship between stress and strain (deflection) in beams by Coulomb's theory. Introduction to the analysis of compressive structural elements by means of Euler's theory.

Theory of structures 311 (STU 311)

Qualification	Undergraduate
Module credits	8.00
Programmes	BSc Architecture
Prerequisites	STU 211 and STU 221
Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	Civil Engineering
Period of presentation	Semester 1

Module content

1. Concrete Structures.
 - Loads on concrete structures, Limit-states design principles.
 - Bending, shear and punching: Design of beams, slabs and footings.
 - Compression members: Design of columns.
2. Load bearing brickwork.
 - Limit-states design principles. Effective length and width of compression members.

Theory of structures 321 (STU 321)

Qualification	Undergraduate
Module credits	8.00
Programmes	BSc Architecture
Prerequisites	STU 311 GS
Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	Civil Engineering
Period of presentation	Semester 2

Module content

1. Timber structures

- Loads on typical timber structures, Limit-states design principles
- Bending, shear and deflection: Design of flexural members without and with axial loads
- Tension members: Tension members in roof trusses
- Compression members: Design of compression members in trusses and as support members for trusses
- Bracing systems

2. Steel Structures

- Loads on typical steel structures, Limit-states design principles
- Bending, shear and deflection: Design of flexural members without and with axial loads
- Tension members: Tension members in roof trusses
- Compression members: Design of compression members in trusses and as support members for trusses
- Bracing systems

Surveying 220 (SUR 220)

Qualification Undergraduate

Module credits 14.00

Programmes [BEng Mining Engineering](#)
[BEng Mining Engineering ENGAGE](#)
[BSc Geography](#)
[BSc Geoinformatics](#)
[BSc Meteorology](#)

Service modules Faculty of Engineering, Built Environment and Information Technology

Prerequisites WTW 114 GS/WTW 134

Contact time 1 practical per week, 2 lectures per week

Language of tuition Module is presented in English

Department Geography Geoinformatics and Meteorology

Period of presentation Semester 2

Module content

Adjustment and use of following instruments: Plane table, level, compass and theodolite. Elementary site surveying and leveling, tachometry. Definition of survey. Co-ordinate systems and bearing. Connections and polars. Methods of determining points. Elevation. Tachometry.

Transportation engineering 323 (SVC 323)

Qualification Undergraduate

Module credits 16.00

Programmes [BEng Civil Engineering](#)
[BEng Civil Engineering ENGAGE](#)

Prerequisites BES 220

Contact time 2 practicals per week, 4 lectures per week

Language of tuition	Separate classes for Afrikaans and English
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Department	Civil Engineering
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Period of presentation	Semester 2
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Module content

Introduction to transportation engineering; vehicle performance and motion; traffic analysis techniques; traffic data collection; capacity and level of service analysis; railway engineering; airport capacity; geometric road design; cross-section, horizontal and vertical alignment; urban streets; layout considerations and intersection design; traffic control; traffic safety.

Infrastructure planning 412 (SVC 412)

Qualification	Undergraduate
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Module credits	16.00
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Programmes	BEng Civil Engineering BEng Civil Engineering ENGAGE
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Prerequisites	(SIE 310/BIE 310) (SVC 323)
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Contact time	2 practicals per week, 4 lectures per week
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Language of tuition	Separate classes for Afrikaans and English
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Department	Civil Engineering
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Period of presentation	Semester 1
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Module content

Introduction to the basic concepts of urban and regional planning. The planning process, policy and institutional framework in which planning functions in SA. The interaction and co-operation of land and space, economy, politics and social aspects related to space in decision making. Interventions for sustainable development planning and design; definitions and rationale for land-use management and the strategic integrated development planning process. Infrastructure system evaluation, risk assessment, feasibility and decision analysis. Life cycle costing of infrastructure. Demand and supply analysis. Demand forecasting models.

Transportation planning 789 (SVC 789)

Qualification	Postgraduate
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Module credits	24.00
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Prerequisites	No prerequisites.
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Contact time	40 Contact hours
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Language of tuition	Module is presented in English
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Department	Civil Engineering
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Period of presentation	Year
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Module content

A research term paper will be prepared.

Introduction to transport planning processes and institutions in S.A. Introduction to contemporary issues in land use/transport planning (including in urban transport; rural transport; air transport; energy and environment). Social, economic, and political impacts and dependencies of transport. Project evaluation, discounting, inflation, engineering economic studies. Benefit - cost analysis. Risk and sensitivity analysis. Social accounting for transport projects.

Transportation studies 790 (SVC 790)

Qualification	Postgraduate
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Module credits	24.00
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Programmes	BEngHons Transportation Engineering BScHons Applied Science Transportation Planning
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Prerequisites	No prerequisites.
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Contact time	40 Contact hours
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Language of tuition	Module is presented in English
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Department	Civil Engineering
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Period of presentation	Year
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Module content

A research term paper will be prepared.

Basic transportation relationships, land use, data collection and surveys. Four step transportation model, trip generation, trip distribution, modal split, trip assignment, advanced modelling approaches. Introduction to discrete choice models, econometrics, and stated preference analysis. Role of transport modelling in developmental context.

Transportation special 791 (SVC 791)

Qualification	Postgraduate
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Module credits	24.00
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Programmes	BEngHons Transportation Engineering BScHons Applied Science Transportation Planning
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Prerequisites	No prerequisites.
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Contact time	40 Contact hours
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Language of tuition	Module is presented in English
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Department	Civil Engineering
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Period of presentation	Year
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Module content

A research term paper will be prepared.

Basic transportation relationships, land use, data collection and surveys. Four step transportation model, trip generation, trip distribution, modal split, trip assignment, advanced modelling approaches. Introduction to discrete choice models, econometrics, and stated preference analysis. Role of transport modelling in developmental context.

Traffic engineering 792 (SVC 792)

Qualification	Postgraduate
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Module credits	24.00
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Programmes	BEngHons Transportation Engineering BScHons Applied Science Transportation Planning
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Prerequisites	No prerequisites.
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Contact time	40 Contact hours
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Language of tuition	Module is presented in English
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Department	Civil Engineering
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Period of presentation	Year
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Module content

A research term paper will be prepared.

Part 1: Traffic flow theory: Traffic and vehicle characteristics. Traffic flow studies. Traffic interactions. Traffic flow analysis and queuing theory. Traffic flow models. Traffic control theory. Part 2: Traffic studies and facility design: Transportation and land use. Traffic impact studies. Site planning and design. Determination of demand. Traffic control investigations. Intersection design. Internal circulation. Parking areas.

Dissertation 890 (SVI 890)

Qualification	Postgraduate
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Module credits	180.00
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Programmes	MEng Transportation Engineering
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Prerequisites	No prerequisites.
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Language of tuition	Module is presented in English
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Department	Civil Engineering
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Period of presentation	Year
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Mini-dissertation 896 (SVI 896)

Qualification	Postgraduate
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Module credits	64.00
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Prerequisites	No prerequisites.
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Language of tuition	Module is presented in English
Department	Civil Engineering
Period of presentation	Semester 1

Multimodal transport 788 (SVV 788)

Qualification	Postgraduate
Module credits	24.00
Prerequisites	No prerequisites.
Contact time	40 Contact hours

Language of tuition	Module is presented in English
Department	Civil Engineering
Period of presentation	Year

Module content

A research term paper will be prepared.

The role of public transport in cities; theory and principles of public transport network design, scheduling and operations; terminals; public transport modes; costs, fares and subsidies; contemporary issues and approaches to public transport restructuring and formalisation in South Africa, including Bus Rapid Transit (BRT). Planning and designing for non-motorised transport, including pedestrians, bicyclists, and animal-drawn transport.

Geometric design and safety 791 (SVV 791)

Qualification	Postgraduate
Module credits	24.00
Prerequisites	No prerequisites.
Contact time	40 Contact hours

Language of tuition	Module is presented in English
Department	Civil Engineering
Period of presentation	Year

Module content

A research term paper will be prepared.

Rural/Peri-urban road networks: transportation policy, standards and safety, environmental quality, capacity, design, interchanges. Urban street networks: functional classes, town planning considerations, capacities, environment, safety, standards design, evaluation of road networks.

Traffic safety in global and national content, Road Safety Engineering and the assessment and interpretation of accident information, reactive and proactive identification of remedial measures, traffic safety strategies: 3E model and Haddon matrix.

Mechanics 122 (SWK 122)

Qualification	Undergraduate
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Module credits	16.00
Programmes	BEng Chemical Engineering BEng Chemical Engineering ENGAGE BEng Civil Engineering BEng Civil Engineering ENGAGE BEng Computer Engineering BEng Computer Engineering ENGAGE BEng Electrical Engineering BEng Electrical Engineering ENGAGE BEng Electronic Engineering BEng Electronic Engineering ENGAGE BEng Industrial Engineering BEng Industrial Engineering ENGAGE BEng Mechanical Engineering BEng Mechanical Engineering ENGAGE BEng Metallurgical Engineering BEng Metallurgical Engineering ENGAGE BEng Mining Engineering BEng Mining Engineering ENGAGE BSc Engineering and Environmental Geology BSc Extended programme - Physical Sciences BSc Meteorology
Service modules	Faculty of Natural and Agricultural Sciences
Prerequisites	WTW 158
Contact time	2 tutorials per week, 4 lectures per week
Language of tuition	Module is presented in English
Department	Civil Engineering
Period of presentation	Semester 2

Module content

Equivalent force systems, resultants. Newton's laws, units. Forces acting on particles. Rigid bodies: principle of transmissibility, resultant of parallel forces. Vector moments and scalar moments. Relationship between scalar- and vector moments. Couples. Equivalent force systems on rigid bodies. Resultants of forces on rigid bodies. Equilibrium in two and three dimensions. Hooke's law. Trusses and frameworks. Centroids and second moments of area. Beams: distributed forces, shear force, bending moment, method of sections, relationship between load, shear force and bending moment.

Strength of materials 210 (SWK 210)

Qualification	Undergraduate
Module credits	16.00

Programmes	BEng Chemical Engineering BEng Chemical Engineering ENGAGE BEng Civil Engineering BEng Civil Engineering ENGAGE BEng Mining Engineering BEng Mining Engineering ENGAGE BSc Engineering and Environmental Geology BSc Geology
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Service modules	Faculty of Natural and Agricultural Sciences
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Prerequisites	Faculty of Engineering, Built Environment and Information Technology: SWK 122 and WTW 164 OR SWK 122, WTW 161 and WTW 168. Faculty of Natural and Agricultural Sciences: SWK 122 and WTW 124 OR SWK 122, WTW 126 and WTW 128.
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Contact time	2 tutorials per week, 4 lectures per week
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Language of tuition	Module is presented in English
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Department	Civil Engineering
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Period of presentation	Semester 1
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Module content

Stresses, strains and the mechanical properties of materials: Normal stress and shear stress, tension and compression, equilibrium in shear, factor of safety, design, shear strain, stress/strain diagram, Hooke’s Law, Poisson’s Ratio and the shear stress/strain diagram. Axial loads: Elastic deformation, displacements, statically determinate and indeterminate structures and thermal effects. Torsion: Torsion of circular bars and power transmission bending of straight members and composite beams. Transverse shear: Shear in straight members and shear flow. Combined loads: Thin walled pressure vessels and stresses as a result of combined loads. Stress transformation: Plane stress transformation, principle stresses, maximum values and stress variation in prismatic beams. Strain transformation: Plane strain transformation, principle strains, maximum values, strain gauges and rosettes and the relationship between E, G and μ . Design of beams from section characteristics. Deflection of beams: The elastic curve, integration method, Macaulay’s method and superposition.

Strength of materials II 211 (SWK 211)

Qualification	Undergraduate
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Module credits	16.00
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Programmes	BEng Civil Engineering BEng Civil Engineering ENGAGE
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Prerequisites	SWK 122
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Contact time	1 practical per week, 2 lectures per week, 3 tutorials per week
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Language of tuition	Module is presented in English
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Department	Civil Engineering
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Period of presentation	Semester 1
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Module content

Centroids: centroids of lines, surfaces and volumes. Second moment of area, parallel axis theorem, products of inertia, moment of inertia around inclined axes. Fluid statics: resultant forces and their points of application on flat and curve surfaces. Constraints and statical determinacy. Shear forces and bending moments in beams. Deflection of beams: derivation and integration of differential equations. Friction: friction on surfaces, wedges and screws. Vibration: free undamped vibration, free damped vibration, forced undamped vibration, forced damped vibration, natural frequency and resonance. Cables: distributed loads, parabolic and uniform cables.

Workshop practice 121 (SWP 121)

Qualification Undergraduate

Module credits 6.00

Programmes [BEng Civil Engineering](#)
[BEng Civil Engineering ENGAGE](#)

Prerequisites No prerequisites.

Contact time 1 other contact session per week

Language of tuition Module is presented in English

Department Civil Engineering

Period of presentation Semester 2

Module content

*Attendance module only

The module is offered at the end of the first year of study and lasts at least eight days during which the students receive training in the following workshops: formwork, scaffolding, masonry, welding and structural steel.

Textiles: Utilities, fibres and yarns 212 (TKS 212)

Qualification Undergraduate

Module credits 14.00

Programmes [BConSci Clothing Retail Management](#)
[BSc Interior Architecture](#)

Service modules Faculty of Engineering, Built Environment and Information Technology

Prerequisites No prerequisites.

Contact time 1 practical per week, 3 lectures per week

Language of tuition Module is presented in English

Department Consumer and Food Sciences

Period of presentation Semester 1

Module content

Utility aspects: basic components of textiles, consumer decision making, utility aspects that include durability, comfort, maintenance, health/safety/protection and aesthetic aspects. Fibres and yarns: Fibre structure and performance including textile chemistry, fibre morphology and formation, fibre properties, classification and identification. Yarn structure and performance (including spun yarns, filament yarns, compound and novelty yarns).

Site analysis and assessment 110 (TPA 110)

Qualification	Undergraduate
Module credits	16.00
Programmes	BTRP
Prerequisites	No prerequisites.
Contact time	1 practical per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Town and Regional Planning
Period of presentation	Semester 1

Module content

Analysis and assessment of sites for planning purposes. Covers the analysis of context and natural (e.g. climate, geology), man-made (e.g. zoning, potential land value, land use and activity), and sensory elements (e.g. genius loci) of a site to determine the appropriate use of a site as well as the character of future development. Skills and techniques to communicate the analysis and assessment graphically.

Settlement analysis and assessment 120 (TPA 120)

Qualification	Undergraduate
Module credits	16.00
Programmes	BTRP
Prerequisites	No prerequisites.
Contact time	1 practical per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Town and Regional Planning
Period of presentation	Semester 2

Module content

Theoretical component: South African cities in a global economic and national context; a framework for settlement analysis; overview and discussion of important demographic, social, economic, environmental and local government features of selected South African cities. Practical component: basic writing and presentation skills for planners; field methods; participatory methods; surveys; secondary sources; settlement analysis in a political context; analysis of a suburb in the Pretoria area.

Plan and policy analysis and assessment 210 (TPA 210)

Qualification	Undergraduate
Module credits	12.00
Programmes	BTRP
Prerequisites	No prerequisites.
Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	Town and Regional Planning
Period of presentation	Semester 1

Module content

Analysis and assessment of plans and policy frameworks from a planning and development perspective. Analysis and assessment of substantive and communicative content. Deconstruction of text, norms and values, planning and development approaches. The role of planners and the democratisation of planning.

Introduction to development planning 210 (TPD 210)

Qualification	Undergraduate
Module credits	12.00
Programmes	BTRP
Prerequisites	No prerequisites.
Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	Town and Regional Planning
Period of presentation	Semester 1

Module content

Introduction to development problems, perspectives on and concepts of development. Approaches to development planning and development studies. Application of development proposals from local to national levels. International and local perspectives and case studies. Critical evaluation of development initiatives, and aspects such as culture, gender, diversity and sustainability. Role players in the development process

Municipal development planning 220 (TPD 220)

Qualification	Undergraduate
Module credits	12.00
Programmes	BTRP
Prerequisites	No prerequisites.
Contact time	3 lectures per week
Language of tuition	Module is presented in English

Department	Town and Regional Planning
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Period of presentation	Semester 2
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Module content

Theories and processes of strategic, forward, and integrated development planning; origins and intentions of these concepts; international and local perspectives and case studies; policy framework for development planning in the South African context; role players in development planning processes, with specific reference to the role of the planner and the community; introduction to the concept, theory, aims, processes and practise of participatory planning.

Regional development planning 310 (TPD 310)

Qualification	Undergraduate
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Module credits	12.00
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Programmes	BTRP
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Prerequisites	No prerequisites.
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Contact time	3 lectures per week
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Language of tuition	Module is presented in English
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Department	Town and Regional Planning
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Period of presentation	Semester 1
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Module content

Theory and practice of regional development planning; strategic regional development analysis and thinking; preparation and implementation of regional development frameworks, and plans and strategies on supranational, national, provincial and metropolitan levels.

Rural development planning 320 (TPD 320)

Qualification	Undergraduate
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Module credits	12.00
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Programmes	BTRP
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Prerequisites	No prerequisites.
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Contact time	3 lectures per week
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Language of tuition	Module is presented in English
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Department	Town and Regional Planning
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Period of presentation	Semester 1
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Module content

Rural development in historical, political, ideological, social, economical, geographical and institutional context; theoretical perspectives on and approaches to rural development; case studies of rural development planning and plans in different developmental contexts; preparation, implementation and evaluation of rural development frameworks, strategies and plans.

Integrated development planning 820 (TPD 820)

Qualification	Postgraduate
Module credits	20.00
Programmes	MTRP (Coursework)
Prerequisites	No prerequisites.
Contact time	40 contact hours per semester
Language of tuition	Module is presented in English
Department	Town and Regional Planning
Period of presentation	Semester 2

Module content

Introduction to development and development planning theories; the integrated development planning process; legal, institutional and policy frameworks in which integrated planning functions in South Africa; implementation of integrated development plans; case studies of integrated development planning; simulations of integrated development planning exercises.

Research methodology 410 (TPE 410)

Qualification	Undergraduate
Module credits	12.00
Programmes	BTRP
Prerequisites	No prerequisites.
Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	Town and Regional Planning
Period of presentation	Semester 1

Module content

Defining research; research paradigms; research ethics; research problems/questions; literature reviews; research design; selected qualitative and quantitative methods for data collection, analysis and interpretation; reporting research; formulation of a research proposal.

Research report 420 (TPE 420)

Qualification	Undergraduate
Module credits	30.00
Programmes	BTRP
Prerequisites	TPE 410
Language of tuition	Module is presented in English
Department	Town and Regional Planning

Period of presentation Semester 2

Module content

Contextualisation of a research problem/question; literature review; research design and methods; undertake empirical research in line with an approved research proposal; collection, analysis and interpretation of data; writing up of research findings.

Research methodology 810 (TPE 810)

Qualification Postgraduate

Module credits 20.00

Programmes [MTRP \(Coursework\)](#)

Prerequisites No prerequisites.

Language of tuition Module is presented in English

Department Town and Regional Planning

Period of presentation Semester 1

Module content

Defining research; research paradigms; research ethics; research problems/questions; literature reviews; research design; selected qualitative and quantitative methods for data collection, analysis and interpretation; reporting research; formulation of a research proposal.

Mini-dissertation 820 (TPE 820)

Qualification Postgraduate

Module credits 60.00

Programmes [MTRP \(Coursework\)](#)

Prerequisites TPE 810

Language of tuition Module is presented in English

Department Town and Regional Planning

Period of presentation Semester 2

Module content

Contextualisation of a research problem/question; literature review; research design and methods; undertake empirical research in line with an approved research proposal; collection, analysis and interpretation of data; writing up of research findings.

Planning and settlement histories before the Industrial Revolution 110 (TPH 110)

Qualification Undergraduate

Module credits 12.00

Programmes [BTRP](#)

Prerequisites No prerequisites.

Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	Town and Regional Planning
Period of presentation	Semester 1

Module content

An in-depth analysis of city building and urban and regional planning in pre-modern times. The influence on settlement design and planning within the social, political and economic context of the Pre-historic; Classic (Roman and Greek); Feudal and Mercantile eras. Aspects such as visions of ideal cities, settlement patterns, the treatment of public space, the development of the edge of the settlement, functional zones and segregation are covered. Attention is given to the function, role, character, practice and beneficiaries of planning and the role of planners.

Planning and settlement histories since the Industrial Revolution 120 (TPH 120)

Qualification	Undergraduate
Module credits	12.00
Programmes	BTRP
Prerequisites	No prerequisites.
Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	Town and Regional Planning
Period of presentation	Semester 2

Module content

An in-depth analysis of city building and urban and regional planning in modern and post-modern times with special emphasis on the South African situation. The influence on settlement design and planning within the social, political and economic context of Industrial and Post-industrial eras. Aspects such as visions of ideal cities, settlement patterns, the treatment of public space, the development of the edge of the settlement, functional zones and segregation are covered. Attention is given to the function, role, character, practice and beneficiaries of planning and the role of planners.

Planning interventions: Precinct scale 451 (TPI 451)

Qualification	Undergraduate
Module credits	12.00
Programmes	BTRP
Prerequisites	No prerequisites.
Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	Town and Regional Planning

Period of presentation	Semester 2
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Module content

The drafting of urban development and design frameworks to ensure development or redevelopment of urban areas in a relevant, social and environmentally accountable way. Specific focus on rehabilitation of declining city centres, fast growing edge cities, and underdeveloped parts of urban areas. Critique on and improvements of current practice; simulated planning exercise.

Planning interventions: Peri-urban and rural scale 452 (TPI 452)

Qualification	Undergraduate
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Module credits	12.00
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Programmes	BTRP
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Prerequisites	No prerequisites.
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Contact time	3 lectures per week
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Language of tuition	Module is presented in English
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Department	Town and Regional Planning
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Period of presentation	Semester 1
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Module content

Introduction to planning and management of small towns, rural settlements, and peri-urban/rural districts; examples of planning interventions in rural areas; approaches to rural development, techniques and methods for planning in rural areas. Critique on and improvements on current practice; simulated planning exercise.

Planning interventions: Metropolitan scale 453 (TPI 453)

Qualification	Undergraduate
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Module credits	12.00
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Programmes	BTRP
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Prerequisites	No prerequisites.
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Contact time	3 lectures per week
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Language of tuition	Module is presented in English
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Department	Town and Regional Planning
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Period of presentation	Semester 2
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Module content

Introduction to planning at metropolitan level; examples of planning interventions at metropolitan level; approaches to and examples of the delivery of housing, infrastructure and facilities; tensions in resource allocation and prioritising of development in metropolitan areas; institutional requirements and implications of planning and management of metropolitan development; critiques and improvements on current practice; simulated planning exercise.

Planning interventions: Supranational, national and provincial scale 454 (TPI 454)

Qualification	Undergraduate
Module credits	12.00
Programmes	BTRP
Prerequisites	No prerequisites.
Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	Town and Regional Planning
Period of presentation	Semester 1

Module content

Introduction to planning at provincial, national and supranational scale. Approaches to planning and development of regions and provinces. Past and present examples of planning on each of these scales. Planners' roles in planning exercises at these scales; institutional requirements and implications of planning at these scales. Critiques and improvements on current practice; simulated planning exercise.

Metropolitan and urban area-based interventions 811 (TPI 811)

Qualification	Postgraduate
Module credits	20.00
Programmes	MTRP (Coursework)
Prerequisites	No prerequisites.
Contact time	40 contact hours per semester
Language of tuition	Module is presented in English
Department	Town and Regional Planning
Period of presentation	Semester 1

Module content

Scope, nature and rationale of metropolitan and urban area-based interventions; unique problems in metropolitan areas, for example inner city decay, fringe development, housing, services backlog, the dysfunctional apartheid cityscape and dependency on private transport; types of intervention (inter alia institutional, spatial, economic and social) in order to accomplish restructuring and development in metropolitan areas in South Africa in a relevant, social and environmentally accountable way; policy and legislation regarding urban restructuring and development in South Africa; international and local case studies; impact of globalisation on South African metropolitan areas and major cities; simulated metropolitan and urban area-based intervention exercise.

Regional interventions 821 (TPI 821)

Qualification	Postgraduate
Module credits	20.00

Programmes	MTRP (Coursework)
Prerequisites	No prerequisites.
Contact time	40 contact hours per semester
Language of tuition	Module is presented in English
Department	Town and Regional Planning
Period of presentation	Semester 2

Module content

Scope, nature and rationale of regional interventions on both a supra-national and subnational scale; approaches to planning and development on continental, macro-regional, provincial and district scales; types of intervention (inter alia institutional, spatial, economic and social) in order to accomplish restructuring and development in regions in a relevant, social and environmentally accountable way, past and present examples of planning on each of these scales; planners' roles in planning exercises at these scales; critiques and improvements on current practice; rural urban linkages and their significance for regional interventions; debates around the way in which problems facing rural settlements (such as the absence of an economic base and necessary infrastructure, lack of access to land and conflicting demands on natural resources) in regions can be addressed; international and local case studies; simulated regional intervention exercise.

Principles of settlement design 120 (TPS 120)

Qualification	Undergraduate
Module credits	12.00
Programmes	BTRP
Prerequisites	No prerequisites.
Contact time	1 practical per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Town and Regional Planning
Period of presentation	Semester 2

Module content

Introduction to the goals and principles of settlement design. Characteristics and measures as well as the design elements of a good living-environment; settlement design within both urban and rural contexts. Aspects that will be covered include settlement structure (open space and movement systems), sense, symbolism and legibility, accessibility, diversity and opportunity, sustainability, safety, justice and equity.

Settlement design concepts 210 (TPS 210)

Qualification	Undergraduate
Module credits	16.00
Programmes	BTRP
Prerequisites	No prerequisites.
Contact time	1 practical per week, 2 lectures per week

Language of tuition	Module is presented in English
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Department	Town and Regional Planning
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Period of presentation	Semester 1
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Module content

The skills and techniques to design a layout of a new settlement or part of an existing settlement. It includes design for the provision of housing for both high and low income groups, as well as commercial and social facilities, open space systems, transportation systems and services. Design sustainable and equitable areas. Site analysis and assessment; development of alternative concepts; the detail design including the division of erven, infrastructure network, land development control and design guidelines.

Settlement establishment planning and housing delivery 220 (TPS 220)

Qualification	Undergraduate
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Module credits	16.00
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Programmes	BTRP
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Prerequisites	No prerequisites.
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Contact time	1 practical per week, 2 lectures per week
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Language of tuition	Module is presented in English
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Department	Town and Regional Planning
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Period of presentation	Semester 2
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Module content

Institutional and legal frameworks in which settlement establishment and housing provision takes place; user and site requirements; housing typologies and densities; engineering services; role players; financing; simulated exercise; the detail design including the division of erven, infrastructure network, land development control and design guidelines.

Spatial concepts 310 (TPS 310)

Qualification	Undergraduate
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Module credits	16.00
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Programmes	BTRP
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Prerequisites	No prerequisites.
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Contact time	1 practical per week, 2 lectures per week
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Language of tuition	Module is presented in English
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Department	Town and Regional Planning
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Period of presentation	Semester 1
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Module content

Spatial concepts regarding the development and planning of settlements. Morphological development processes such as decentralisation, counter urbanisation, residential infill and succession, urban sprawl. Spatial structuring elements, e.g. corridors, nodes, compact cities, mixed use.

Transport planning 321 (TPS 321)

Qualification	Undergraduate
Module credits	8.00
Programmes	BTRP
Prerequisites	No prerequisites.
Contact time	1 practical per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Town and Regional Planning
Period of presentation	Quarter 3

Module content

Environmental, economic and social impact of transport; transport planning process; introduction to transport studies and evaluation; public transport; functional road hierarchy; geometric road layout; road reserve dimensions; parking; preparation of a layout plan

Municipal services provision 322 (TPS 322)

Qualification	Undergraduate
Module credits	8.00
Programmes	BTRP
Prerequisites	No prerequisites.
Contact time	1 practical per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Town and Regional Planning
Period of presentation	Quarter 4

Module content

Water supply; sanitation; storm water disposal; energy supply; public lighting; solid waste removal; preparation of a layout plan.

Sustainable settlement planning and design 810 (TPS 810)

Qualification	Postgraduate
Module credits	20.00
Programmes	MTRP (Coursework)
Prerequisites	No prerequisites.

Contact time	40 contact hours per semester
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Language of tuition	Module is presented in English
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Department	Town and Regional Planning
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Period of presentation	Semester 1
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Module content

Normative principles for sustainable settlement planning and design; design theory; planning and design processes; simulated urban and rural settlement planning and design exercise.

Introduction to urban design 820 (TPS 820)

Qualification	Postgraduate
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Module credits	20.00
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Programmes	MTRP (Coursework)
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Prerequisites	No prerequisites.
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Contact time	40 contact hours per semester
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Language of tuition	Module is presented in English
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Department	Town and Regional Planning
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Period of presentation	Semester 2
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Module content

Theory of urban design and its relation to town and regional planning; urban design principles for well-performing settlements; urban design process; urban design frameworks and precinct plans; simulated urban design exercise at neighbourhood level.

Theory and practice of land-use management 211 (TPU 211)

Qualification	Undergraduate
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Module credits	12.00
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Programmes	BTRP
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Prerequisites	No prerequisites.
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Contact time	3 lectures per week
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Language of tuition	Module is presented in English
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Department	Town and Regional Planning
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Period of presentation	Semester 1
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Module content

Theoretical component: A brief history of land use management in South Africa; rationale for land use management; principles of good land use management in the context of transformation and development imperatives in post-apartheid South Africa, global environmental change, new economic geography, procedural, substantive and intergenerational justice and development economics; critique of land use management; ethics of land use management; the characteristics of an appropriate land use management system that advances transformation, sustainability, resilience, equity, inclusiveness and integration in South Africa; the link between land use management and strategic spatial planning; international and South African examples of land use management systems; the future of land use management. Practical component: Generic components of land use and land development applications and procedures including township establishment in terms of current legislation; practical exercises in the preparation, submission, processing and evaluation of land use management applications; policy preparation in terms of land use management systems that advance equity, resilience, inclusiveness, sustainability and integration; appeals; introduction to Environmental Impact Studies (EIAs)

Urban land development economics 221 (TPU 221)

Qualification	Undergraduate
Module credits	12.00
Programmes	BTRP
Prerequisites	No prerequisites.
Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	Town and Regional Planning
Period of presentation	Semester 2

Module content

The economics of settlements, including aspects such as economic advantages, transformation, equity, integration and inclusiveness; locational choices of urban land uses; density and intensity of development; the effects of densities, location and transportation economics on land values; implications of zoning; implications for sustainability and risk reduction; the cost of urban growth, whether by densification or sprawl. The functioning of the property market, e.g. how the property market works for the urban poor; key role players and decision-making in the property market; the role of urban planning as well as local government and their financial viability in the property market.

Land use management and land development 810 (TPU 810)

Qualification	Postgraduate
Module credits	20.00
Programmes	MTRP (Coursework)
Prerequisites	No prerequisites.
Contact time	40 contact hours per semester
Language of tuition	Module is presented in English

Department	Town and Regional Planning
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Period of presentation	Semester 1
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Module content

A brief history of land use management in South Africa; rationale for land use management; principles of good land use management in the context of transformation and development imperatives in post-apartheid South Africa, global environmental change, new economic geography, procedural, substantive and intergenerational justice and development economics; critique of land use management; ethics of land use management; the characteristics of an appropriate land use management system that advances transformation, sustainability, resilience, equity, inclusiveness and integration in South Africa; the link between land use management and strategic spatial planning; international and South African examples of land use management systems; the future of land use management. Generic components of land use and land development applications and procedures; practical exercises in the preparation, submission, processing and evaluation of land use management applications; policy preparation in terms of land use management systems that advance the principles of effective, efficient and sustainable land use management; appeals; introduction to Environmental Impact Studies (EIAs).

Institutional and legal structures for planning 310 (TPW 310)

Qualification	Undergraduate
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Module credits	12.00
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Programmes	BTRP
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Prerequisites	No prerequisites.
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Contact time	3 lectures per week
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Language of tuition	Module is presented in English
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Department	Town and Regional Planning
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Period of presentation	Semester 1
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Module content

Overview of South African institutional and legal structures for planning and development, on national and provincial scale. Relevant legislation and policies that influence planning. Specific reference to the legal frameworks guiding land development, the environment, municipal management and development, housing, transport, water, and Human Rights.

Institutional and legal structures for planning 810 (TPW 810)

Qualification	Postgraduate
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Module credits	20.00
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Programmes	MTRP (Coursework)
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Prerequisites	No prerequisites.
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Contact time	40 contact hours per semester
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Language of tuition	Module is presented in English
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Department	Town and Regional Planning
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Period of presentation	Semester 1
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Module content

Overview of South African institutional and legal structures for planning and development, on national and provincial scale. Relevant legislation and policies that influence planning. Specific reference to the legal frameworks guiding land development, the environment, municipal management and development, housing, transport, water, and Human Rights.

Site surveying 213 (TRN 213)

Qualification	Undergraduate
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Module credits	12.00
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Programmes	BSc Construction Management BSc Quantity Surveying BSc Real Estate
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Prerequisites	No prerequisites.
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Contact time	1 practical per week, 2 lectures per week
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Language of tuition	Module is presented in English
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Department	Geography Geoinformatics and Meteorology
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Period of presentation	Semester 1
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Module content

General surveying; instruments, their handling and adjusting; surveying systems and simple calculations; determining of levels; setting out of the works; tacheometry and plotting; scales, planimetry; areas and volumes; construction surveying; aerial photography.

Introduction to planning 110 (TRP 110)

Qualification	Undergraduate
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Module credits	12.00
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Programmes	BTRP
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Prerequisites	No prerequisites.
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Contact time	3 lectures per week
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Language of tuition	Module is presented in English
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Department	Town and Regional Planning
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Period of presentation	Semester 1
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Module content

Definitions of planning; rationale for planning; focus areas of planning; planning processes; planners' roles and work places; the institutional framework for planning; planning legislation; values and ethics of planners; the future of planning.

Town and regional planning 311 (TRP 311)

Qualification	Undergraduate
Module credits	8.00
Prerequisites	No prerequisites.
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Town and Regional Planning
Period of presentation	Semester 1

Module content

Introduction to the basic concepts of urban and regional planning. The planning process, policy and institutional framework in which planning functions in South Africa. The interaction and co-operation of land and space, economy, politics and social aspects related to space in decision making and the support thereof. Interventions with regard to normative principles for sustainable development planning and design, definitions and rationale with land-use management and the strategic integrated development planning process.

Planning prospects 320 (TRP 320)

Qualification	Undergraduate
Module credits	12.00
Programmes	BTRP
Prerequisites	No prerequisites.
Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	Town and Regional Planning
Period of presentation	Semester 2

Module content

Critical reflections on planning as construct, activity and profession. Case study-based exploration of innovative planning practices.

Professional practice 412 (TRP 412)

Qualification	Undergraduate
Module credits	6.00
Programmes	BTRP
Prerequisites	No prerequisites.
Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	Town and Regional Planning

Period of presentation	Quarter 2
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Module content

Starting a career in the planning profession (including issues such as public vs. private sector employment, essential skills required, applying for vacancies, interaction with co-workers and other parties, company culture, client relationships, workplace ethics); developing a career in the planning profession (including issues such as essential communication-, management- and political-skills, typical mistakes to avoid in practice, setting a career path); introduction to project management; an overview of professional planning organisations in South Africa; remaining issues for class discussion, such as marketing, client service, promotion and time management.

An overview of planning theory and practice 810 (TRP 810)

Qualification	Postgraduate
Module credits	20.00
Programmes	MTRP (Coursework)
Prerequisites	No prerequisites.
Contact time	40 contact hours per semester
Language of tuition	Module is presented in English
Department	Town and Regional Planning
Period of presentation	Semester 1

Academic orientation 112 (UPO 112)

Qualification	Undergraduate
Module credits	0.00

Programmes

BEng Chemical Engineering
BEng Chemical Engineering ENGAGE
BEng Civil Engineering
BEng Civil Engineering ENGAGE
BEng Computer Engineering
BEng Computer Engineering ENGAGE
BEng Electrical Engineering
BEng Electrical Engineering ENGAGE
BEng Electronic Engineering
BEng Electronic Engineering ENGAGE
BEng Industrial Engineering
BEng Mechanical Engineering
BEng Mechanical Engineering ENGAGE
BEng Metallurgical Engineering
BEng Metallurgical Engineering ENGAGE
BEng Mining Engineering
BEng Mining Engineering ENGAGE
BIS Information Science
BIS Multimedia
BIS Publishing
BIT Information Systems
BSc Architecture
BSc Computer Science
BSc Construction Management
BSc Information and Knowledge Systems
BSc Interior Architecture
BSc Landscape Architecture
BSc Quantity Surveying
BSc Real Estate
BTRP

Language of tuition	Module is presented in English
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Department	EBIT Deans Office
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Period of presentation	Year
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Thesis: Transportation engineering 990 (VIN 990)

Qualification	Postgraduate
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Module credits	360.00
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Prerequisites	No prerequisites.
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Language of tuition	Module is presented in English
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Department	Civil Engineering
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Period of presentation	Year
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Visual design (1) 102 (VIO 102)

Qualification	Undergraduate
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Module credits	16.00
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Programmes	BIS Multimedia
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	5 for Mathematics or WTW 114 or WTW 133 and 143
Contact time	1 lecture per week, 1 practical per week
Language of tuition	Module is presented in English
Department	School of the Arts
Period of presentation	Year

Module content

*Only for students who specialise in BIS Multimedia

Introduction to elements and principles of design, typography and layout. Application of visual principles and techniques. Media characteristics. The design process.

Visual design (2) 202 (VIO 202)

Qualification	Undergraduate
Module credits	24.00
Programmes	BIS Multimedia
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	VIO 102
Contact time	1 discussion class per week, 1 lecture per week, 1 practical per week
Language of tuition	Module is presented in English
Department	School of the Arts
Period of presentation	Year

Module content

*Requires VIO 102

*Only for students who specialise in BIS Multimedia

Visual analysis and interpretation. Design function and specific applications in the electronic environment. Aesthetic, functional and communicative evaluation of design.

Visual culture studies 111 (VKK 111)

Qualification	Undergraduate
Module credits	12.00

Programmes	BA
	BA Extended programme
	BA Fine Arts
	BA Information Design
	BA Languages
	BA Visual Studies
	BIS Publishing
	BPolSci Political Studies
	BSocSci Heritage and Cultural Tourism

Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	No prerequisites.
Contact time	3 lectures per week
Language of tuition	Module is presented in English
Department	School of the Arts
Period of presentation	Semester 1

Module content

Foundations of visual culture

This module introduces art and visual culture theory using a wide range of texts and ideas. The module gives students wide exposure to visual discourses and includes a variety of visual culture examples e.g. artworks, advertisements. These discourses may include: exploring what visual culture is; modes of analysis; introducing terminology such as ideology and myth; dealing with selected periods from history contextually; introducing cultural icons and themes from popular visual culture.

Visual culture studies 211 (VKK 211)

Qualification	Undergraduate
Module credits	20.00
Programmes	BA
	BA Fine Arts
	BA Information Design
	BA Languages
	BA Visual Studies
	BIS Publishing
	BPolSci Political Studies
	BSocSci Heritage and Cultural Tourism

Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	No prerequisites.
Contact time	1 discussion class per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	School of the Arts
Period of presentation	Semester 1

Module content

Gender, sexuality and visual representation

Introduction to the representation of sex, gender and sexuality in visual culture. Gender theory and terminology related to feminism, masculinity studies and *lbgtq* theory (lesbian, bisexual, gay, transgendered, queer) are unpacked. Themes and issues in gender and identity politics such as the male hero, the nude in late 19th century art, the femme fatale, hysteria, androgyny and transsexuality are dealt with. Sexuality and gender issues across a range of visual cultural such as soaps, sitcoms, artworks, advertisements, fashion, music videos and films are addressed.

Sustainable construction 320 (VKN 320)

Qualification	Undergraduate
Module credits	8.00
Programmes	BSc Construction Management BSc Quantity Surveying BSc Real Estate
Prerequisites	No prerequisites.
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Construction Economics
Period of presentation	Semester 2

Module content

Introduction to sustainable development and general sustainable construction principles, processes and technology. Sustainable practices on the construction site. Relevant regulations and voluntary programmes, including an introduction to 'Green Star' rating. Introduction to the principles of lean construction and BIM.

Industrial waste engineering 780 (WAI 780)

Qualification	Postgraduate
Module credits	32.00
Programmes	BEngHons Environmental Engineering BEngHons Water Utilisation Engineering
Prerequisites	No prerequisites.
Contact time	32 contact hours per semester
Language of tuition	Module is presented in English
Department	Chemical Engineering
Period of presentation	Semester 1 or Semester 2

Module content

Identification of source materials, physical and chemical properties of waste. Release and transport mechanisms from source to air, groundwater, soil. Primary pathways of contaminants including sorption, volatilisation, biotic and abiotic transformations. Toxicology: absorption, distribution, biochemical transformation, and secretion of chemicals. Acute and chronic toxicity quantification and evaluation of risk. Hazard identification, exposure assessment, toxicity assessment and risk characterisation. Minimum requirements for the handling, classification and disposal of hazardous waste. Minimum requirements for waste disposal by landfill. Minimum requirements for water monitoring at waste management facilities. Recycling and resource management. Waste prevention, minimisation and optimisation.

Industrial waste engineering 787 (WAI 787)

Qualification	Postgraduate
Module credits	32.00
Programmes	BScHons Applied Science Environmental Technology BScHons Applied Science Water Utilisation
Prerequisites	No prerequisites.
Contact time	32 contact hours per semester
Language of tuition	Module is presented in English
Department	Chemical Engineering
Period of presentation	Semester 2

Module content

Identification of source materials, physical and chemical properties of waste. Release and transport mechanisms from source to air, groundwater, soil. Primary pathways of contaminants including sorption, volatilisation, biotic and abiotic transformations. Toxicology: absorption, distribution, biochemical transformation, and secretion of chemicals. Acute and chronic toxicity quantification and evaluation of risk. Hazard identification, exposure assessment, toxicity assessment and risk characterisation. Minimum requirements for the handling, classification and disposal of hazardous waste. Minimum requirements for waste disposal by landfill. Minimum requirements for water monitoring at waste management facilities. Recycling and resource management. Waste prevention, minimisation and optimisation.

Dissertation: Water utilisation 890 (WBC 890)

Qualification	Postgraduate
Module credits	180.00
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Chemical Engineering
Period of presentation	Year

Thesis: Water utilisation 990 (WBC 990)

Qualification	Postgraduate
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Module credits	360.00
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Chemical Engineering
Period of presentation	Year

Dissertation: Water utilisation engineering 890 (WBI 890)

Qualification	Postgraduate
Module credits	180.00
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Chemical Engineering
Period of presentation	Year

Thesis: Water utilisation engineering 990 (WBI 990)

Qualification	Postgraduate
Module credits	360.00
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Chemical Engineering
Period of presentation	Year

Dissertation: Water resource engineering 890 (WBK 890)

Qualification	Postgraduate
Module credits	180.00
Programmes	MEng Water Resources Engineering
Prerequisites	No prerequisites.
Language of tuition	Module is presented in English
Department	Civil Engineering
Period of presentation	Year

Biological water treatment 780 (WBW 780)

Qualification	Postgraduate
Module credits	32.00
Programmes	BEngHons Chemical Engineering BEngHons Water Utilisation Engineering

Prerequisites	No prerequisites.
Contact time	32 contact hours per semester
Language of tuition	Module is presented in English
Department	Chemical Engineering
Period of presentation	Semester 1

Biological water treatment 787 (WBW 787)

Qualification	Postgraduate
Module credits	32.00
Programmes	BScHons Applied Science Water Utilisation
Prerequisites	No prerequisites.
Contact time	32 contact hours per semester
Language of tuition	Module is presented in English
Department	Chemical Engineering
Period of presentation	Semester 1

Chemical water treatment 780 (WCW 780)

Qualification	Postgraduate
Module credits	32.00
Programmes	BEngHons Water Utilisation Engineering
Prerequisites	No prerequisites.
Contact time	32 contact hours per semester
Language of tuition	Module is presented in English
Department	Chemical Engineering
Period of presentation	Semester 1

Chemical water treatment 787 (WCW 787)

Qualification	Postgraduate
Module credits	32.00
Programmes	BScHons Applied Science Water Utilisation
Prerequisites	No prerequisites.
Contact time	32 contact hours per semester
Language of tuition	Module is presented in English
Department	Chemical Engineering
Period of presentation	Semester 1

Membrane processes 780 (WIM 780)

Qualification	Postgraduate
Module credits	16.00
Prerequisites	No prerequisites.
Contact time	32 contact hours per semester
Language of tuition	Module is presented in English
Department	Chemical Engineering
Period of presentation	Semester 1

Membrane processes 787 (WIM 787)

Qualification	Postgraduate
Module credits	16.00
Prerequisites	No prerequisites.
Contact time	10 lectures per week
Language of tuition	Module is presented in English
Department	Chemical Engineering
Period of presentation	Semester 1

Water quality management and research 780 (WQB 780)

Qualification	Postgraduate
Module credits	32.00
Programmes	BEngHons Environmental Engineering BEngHons Water Utilisation Engineering
Prerequisites	No prerequisites.
Contact time	32 contact hours per semester
Language of tuition	Module is presented in English
Department	Chemical Engineering
Period of presentation	Semester 1 or Semester 2

Water quality management and research 787 (WQB 787)

Qualification	Postgraduate
Module credits	32.00
Programmes	BScHons Applied Science Environmental Technology BScHons Applied Science Water Utilisation
Contact time	32 contact hours per semester
Language of tuition	Module is presented in English

Department	Chemical Engineering
Period of presentation	Semester 1 or Semester 2

Module content

Water quality parameters: physical, chemical, biological, microbiological; Units of expression; Evaluation of parameters; Methods of analysis and practical laboratory analyses; Water quality interpretation, evaluation and assessment, water quality guidelines and requirements for domestic, industrial, agricultural, ecological, recreational requirements; Limnology and water quality in rivers and lakes; Surface water modelling; Ground water quality and assessment; Regulatory aspects including all relevant legislation; Integrated environmental management, integrated pollution control; Procedures to assess effluent discharge impacts; and Water quality management, policies and procedures, role of catchment management agencies, and catchment management plans.

Mathematical statistics 111 (WST 111)

Qualification	Undergraduate
Module credits	16.00
Programmes	BCom BCom Econometrics BCom Statistics BCom Statistics and Data Science BSc Actuarial and Financial Mathematics BSc Applied Mathematics BSc Computer Science BSc Information and Knowledge Systems BSc Mathematical Statistics BSc Mathematics BSc Meteorology BSc Physics
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Economic and Management Sciences Faculty of Natural and Agricultural Sciences
Prerequisites	At least 5 (60-69%) in Mathematics in the Grade 12 examination
Contact time	1 practical per week, 4 lectures per week
Language of tuition	Module is presented in English
Department	Statistics
Period of presentation	Semester 1

Module content

Characterisation of a set of measurements: Graphical and numerical methods. Random sampling. Probability theory. Discrete and continuous random variables. Probability distributions. Generating functions and moments.

Mathematical statistics 121 (WST 121)

Qualification Undergraduate

Module credits 16.00

Programmes

- BCom
- BCom Econometrics
- BCom Statistics
- BCom Statistics and Data Science
- BSc Actuarial and Financial Mathematics
- BSc Applied Mathematics
- BSc Computer Science
- BSc Extended programme - Mathematical Sciences
- BSc Information and Knowledge Systems
- BSc Mathematical Statistics
- BSc Mathematics
- BSc Meteorology
- BSc Physics

Service modules

- Faculty of Engineering, Built Environment and Information Technology
- Faculty of Economic and Management Sciences
- Faculty of Natural and Agricultural Sciences

Prerequisites WST 111 GS or WST 133, 143 and 153

Contact time 1 practical per week, 4 lectures per week

Language of tuition Module is presented in English

Department Statistics

Period of presentation Semester 2

Module content

Sampling distributions and the central limit theorem. Statistical inference: Point and interval estimation. Hypothesis testing with applications in one and two-sample cases. Introductory methods for: Linear regression and correlation, analysis of variance, categorical data analysis and non-parametric statistics. Identification, use, evaluation and interpretation of statistical computer packages and statistical techniques.

Mathematical statistics 211 (WST 211)

Qualification Undergraduate

Module credits 24.00

Programmes

- BCom
- BCom Econometrics
- BCom Statistics
- BCom Statistics and Data Science
- BSc Actuarial and Financial Mathematics
- BSc Applied Mathematics
- BSc Mathematical Statistics
- BSc Mathematics
- BSc Meteorology
- BSc Physics

Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Economic and Management Sciences Faculty of Natural and Agricultural Sciences
Prerequisites	WST 111, WST 121, WTW 114 GS and WTW 124 GS
Contact time	2 practicals per week, 4 lectures per week
Language of tuition	Module is presented in English
Department	Statistics
Period of presentation	Semester 1

Module content

Set theory. Probability measure functions. Random variables. Distribution functions. Probability mass functions. Density functions. Expected values. Moments. Moment generating functions. Special probability distributions: Bernoulli, binomial, hypergeometric, geometric, negative binomial, Poisson, Poisson process, discrete uniform, uniform, gamma, exponential, Weibull, Pareto, normal. Joint distributions: Multinomial, extended hypergeometric, joint continuous distributions. Marginal distributions. Independent random variables. Conditional distributions. Covariance, correlation. Conditional expected values. Transformation of random variables: Convolution formula. Order statistics. Stochastic convergence: Convergence in distribution. Central limit theorem. Practical applications. Practical statistical modelling and analysis using statistical computer packages and the interpretation of the output.

Applications in data science 212 (WST 212)

Qualification	Undergraduate
Module credits	12.00
Programmes	BIT Information Systems
Prerequisites	WST 111, WST 121 or STK 110, STC 122
Contact time	1 practical per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Statistics
Period of presentation	Semester 1

Module content

Introductory machine learning concepts. Data base design and use. Data preparation and extraction. Statistical modelling using data base structures. Statistical concepts are demonstrated and interpreted through practical coding and simulation within a data science framework.

Stochastic processes 312 (WST 312)

Qualification	Undergraduate
Module credits	18.00
Programmes	BSc Computer Science

Service modules	Faculty of Economic and Management Sciences Faculty of Natural and Agricultural Sciences
Prerequisites	WST 211, WST 221, WTW 211 GS and WTW 218 GS
Contact time	1 practical per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Statistics
Period of presentation	Semester 1

Module content

Definition of a stochastic process. Stationarity. Covariance stationary. Markov property. Random walk. Brownian motion. Markov chains. Chapman-Kolmogorov equations. Recurrent and transient states. First passage time. Occupation times. Markov jump processes. Poisson process. Birth and death processes. Structures of processes. Structure of the time-homogeneous Markov jump process. Applications in insurance. Practical statistical modelling, analysis and simulation using statistical computer packages and the interpretation of the output.

Time-series analysis 321 (WST 321)

Qualification	Undergraduate
Module credits	18.00
Programmes	BSc Computer Science
Service modules	Faculty of Economic and Management Sciences Faculty of Natural and Agricultural Sciences
Prerequisites	WST 211, WST 221, WTW 211 GS and WTW 218 GS
Contact time	1 practical per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Statistics
Period of presentation	Semester 2

Module content

Note: Only one of the modules WST 321 or STK 320 may be included in any study programme.

Stationary and non-stationary univariate time-series. Properties of autoregressive moving average (ARMA) and autoregressive integrated moving average (ARIMA) processes. Identification, estimation and diagnostic testing of a time-series model. Forecasting. Multivariate time-series. Practical statistical modelling and analysis using statistical computer packages, including that of social responsibility phenomena.

Actuarial statistics 322 (WST 322)

Qualification	Undergraduate
Module credits	18.00
Programmes	BSc Computer Science
Service modules	Faculty of Economic and Management Sciences Faculty of Natural and Agricultural Sciences

Prerequisites	WST 211, WST 221, WTW 211 GS and WTW 218 GS
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Contact time	1 practical per week, 2 lectures per week
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Language of tuition	Module is presented in English
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Department	Statistics
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Period of presentation	Semester 2
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Module content

Bayes estimation. Loss distributions. Reinsurance. Risk models. Ruin theory. Credibility theory. Extreme value theory. Copulas. Practical statistical modelling and analysis using statistical computer packages.

Calculus 114 (WTW 114)

Qualification	Undergraduate
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Module credits	16.00
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Programmes

[BCom](#)
[BCom Econometrics](#)
[BCom Statistics](#)
[BCom Statistics and Data Science](#)
[BEd Senior Phase and Further Education and Training Teaching](#)
[BSc Actuarial and Financial Mathematics](#)
[BSc Applied Mathematics](#)
[BSc Chemistry](#)
[BSc Computer Science](#)
[BSc Mathematical Statistics](#)
[BSc Mathematics](#)
[BSc Meteorology](#)
[BSc Physics](#)

Service modules

Faculty of Engineering, Built Environment and Information Technology
Faculty of Education
Faculty of Economic and Management Sciences
Faculty of Humanities

Prerequisites	60% for Mathematics in Grade 12
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Contact time	1 tutorial per week, 4 lectures per week
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Language of tuition	Module is presented in English
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Department	Mathematics and Applied Mathematics
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Period of presentation	Semester 1
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Module content

*This module serves as preparation for students majoring in Mathematics (including all students who intend to enrol for WTW 218 and WTW 220). Students will not be credited for more than one of the following modules for their degree: WTW 114, WTW 158, WTW 134, WTW 165.

Functions, limits and continuity. Differential calculus of single variable functions, rate of change, graph sketching, applications. The mean value theorem, the rule of L'Hospital. Definite and indefinite integrals, evaluating definite integrals using anti-derivatives, the substitution rule.

Discrete structures 115 (WTW 115)

Qualification	Undergraduate
Module credits	8.00
Programmes	BSc Applied Mathematics BSc Chemistry BSc Computer Science BSc Extended programme - Mathematical Sciences BSc Information and Knowledge Systems BSc Mathematical Statistics BSc Mathematics BSc Meteorology BSc Physics
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Economic and Management Sciences
Prerequisites	50% for Mathematics in Grade 12
Contact time	1 tutorial per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Mathematics and Applied Mathematics
Period of presentation	Semester 1

Module content

Propositional logic: truth tables, logical equivalence, implication, arguments. Mathematical induction and well-ordering principle. Introduction to set theory. Counting techniques: elementary probability, multiplication and addition rules, permutations and combinations, binomial theorem, inclusion-exclusion rule.

Numerical analysis 123 (WTW 123)

Qualification	Undergraduate
Module credits	8.00
Programmes	BSc Actuarial and Financial Mathematics BSc Applied Mathematics BSc Extended programme - Mathematical Sciences BSc Extended programme - Physical Sciences BSc Information and Knowledge Systems BSc Mathematical Statistics BSc Mathematics BSc Physics
Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	WTW 114
Contact time	1 practical per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Mathematics and Applied Mathematics

Period of presentation Semester 2

Module content

Non-linear equations, numerical integration, initial value problems for differential equations, systems of linear equations. Algorithms for elementary numerical techniques are derived and implemented in computer programmes. Error estimates and convergence results are treated.

Mathematics 124 (WTW 124)

Qualification Undergraduate

Module credits 16.00

Programmes

BCom
BCom Econometrics
BCom Statistics
BCom Statistics and Data Science
BEd Senior Phase and Further Education and Training Teaching
BSc Actuarial and Financial Mathematics
BSc Applied Mathematics
BSc Chemistry
BSc Computer Science
BSc Extended programme - Mathematical Sciences
BSc Extended programme - Physical Sciences
BSc Mathematical Statistics
BSc Mathematics
BSc Physics

Service modules

Faculty of Engineering, Built Environment and Information Technology
Faculty of Education
Faculty of Economic and Management Sciences

Prerequisites WTW 114

Contact time 1 tutorial per week, 4 lectures per week

Language of tuition Module is presented in English

Department Mathematics and Applied Mathematics

Period of presentation Semester 2

Module content

*Students will not be credited for more than one of the following modules for their degree: WTW 124, WTW 146, WTW 148 and WTW 164. This module serves as preparation for students majoring in Mathematics (including all students who intend to enrol for WTW 218, WTW 211 and WTW 220).

The vector space R^n , vector algebra with applications to lines and planes, matrix algebra, systems of linear equations, determinants. Complex numbers and factorisation of polynomials. Integration techniques and applications of integration. The formal definition of a limit. The fundamental theorem of Calculus and applications. Vector functions and quadratic curves.

Precalculus 133 (WTW 133)

Qualification Undergraduate

Module credits	8.00
Programmes	BEd Intermediate Phase Teaching BEd Senior Phase and Further Education and Training Teaching BSc Extended programme - Biological and Agricultural Sciences BSc Extended programme - Mathematical Sciences BSc Extended programme - Physical Sciences
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Economic and Management Sciences
Prerequisites	BSc Extended programme - Mathematical Sciences: 60% for Mathematics in Grade 12 Other BSc Extended programmes: 50% for Mathematics Grade 12 BCom Extended programme: 40% for Mathematics in Grade 12 BEd programmes: 50% for Mathematics Grade 12
Contact time	1 practical per week, 1 tutorial per week, 3 lectures per week, Foundation Course
Language of tuition	Module is presented in English
Department	Mathematics and Applied Mathematics
Period of presentation	Semester 1

Module content

Real numbers, elementary set notation, exponents and radicals. Algebraic expressions, fractional expressions, linear and quadratic equations, inequalities. Coordinate geometry: lines, circles. Functions: definition, notation, piecewise defined functions, domain and range, graphs, transformations of functions, symmetry, even and odd functions, combining functions, one-to-one functions and inverses, polynomial functions and zeros.

Sequences, summation notation, arithmetic, geometric sequences, infinite geometric series, annuities and instalments. Degrees and radians, unit circle, trigonometric functions, fundamental identities, trigonometric graphs, trigonometric identities, double-angle, half-angle formulae, trigonometric equations, applications.

This module is offered at the Mamelodi Campus to students from the BSc and BCom Extended programmes. At the Groenkloof Campus it is offered to BEd students.

Mathematics 134 (WTW 134)

Qualification	Undergraduate
Module credits	16.00

Programmes

BCom
BCom Economics
BCom Statistics
BEd Senior Phase and Further Education and Training Teaching
BSc Biochemistry
BSc Biological Sciences
BSc Biotechnology
BSc Computer Science
BSc Construction Management
BSc Culinary Science
BSc Ecology
BSc Entomology
BSc Environmental Sciences
BSc Food Science
BSc Genetics
BSc Geography
BSc Geoinformatics
BSc Human Genetics
BSc Human Physiology
BSc Human Physiology, Genetics and Psychology
BSc Information and Knowledge Systems
BSc Medical Sciences
BSc Microbiology
BSc Nutrition
BSc Plant Science
BSc Quantity Surveying
BSc Real Estate
BSc Zoology
BScAgric Agricultural Economics and Agribusiness Management
BScAgric Animal Science
BScAgric Applied Plant and Soil Sciences
BScAgric Plant Pathology

Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Veterinary Science
Prerequisites	50% for Mathematics in Grade 12
Contact time	1 tutorial per week, 4 lectures per week
Language of tuition	Module is presented in English
Department	Mathematics and Applied Mathematics
Period of presentation	Semester 1

Module content

**Students will not be credited for more than one of the following modules for their degree: WTW 134, WTW 165, WTW 114, WTW 158. WTW 134 does not lead to admission to Mathematics at 200 level and is intended for students who require Mathematics at 100 level only. WTW 134 is offered as WTW 165 in the second semester only to students who have applied in the first semester of the current year for the approximately 65 MBChB, or the 5-6 BChD places becoming available in the second semester and who were therefore enrolled for MGW 112 in the first semester of the current year.*

Functions, derivatives, interpretation of the derivative, rules of differentiation, applications of differentiation, integration, interpretation of the definite integral, applications of integration. Matrices, solutions of systems of equations. All topics are studied in the context of applications.

Calculus 143 (WTW 143)

Qualification Undergraduate

Module credits 8.00

Programmes [BEd Intermediate Phase Teaching](#)
[BEd Senior Phase and Further Education and Training Teaching](#)
[BSc Extended programme - Mathematical Sciences](#)
[BSc Extended programme - Physical Sciences](#)

Service modules Faculty of Engineering, Built Environment and Information Technology
Faculty of Education
Faculty of Economic and Management Sciences

Prerequisites BSc Extended programme and BEd programmes: WTW 133 BCom Extended programme: Students with WST 133 concurrently with WTW 143: WTW 133. Students with STK 133 concurrently with WTW 143: at least 65% for WTW 133.

Contact time 1 tutorial per week, 3 lectures per week, Foundation Course

Language of tuition Module is presented in English

Department Mathematics and Applied Mathematics

Period of presentation Semester 2

Module content

Functions: exponential and logarithmic functions, natural exponential and logarithmic functions, exponential and logarithmic laws, exponential and logarithmic equations, compound interest. Limits: concept of a limit, finding limits numerically and graphically, finding limits algebraically, limit laws without proofs, squeeze theorem without proof, one-sided limits, infinite limits, limits at infinity, vertical, horizontal and slant asymptotes, substitution rule, continuity, laws for continuity without proofs. Differentiation: average and instantaneous change, definition of derivative, differentiation rules without proofs, derivatives of polynomials, chain rule for differentiation, derivatives of trigonometric, exponential and logarithmic functions, applications of differentiation: extreme values, critical numbers, monotone functions, first derivative test, optimisation.

Linear algebra 146 (WTW 146)

Qualification Undergraduate

Module credits 8.00

Programmes	BCom BCom Economics BCom Statistics BEd Senior Phase and Further Education and Training Teaching BSc Computer Science BSc Geoinformatics BSc Information and Knowledge Systems
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Economic and Management Sciences
Prerequisites	50% for Mathematics in Grade 12
Contact time	1 tutorial per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Mathematics and Applied Mathematics
Period of presentation	Semester 2

Module content

*Students will not be credited for more than one of the following modules for their degree: WTW 124, WTW 146 and WTW 164. The module WTW 146 is designed for students who require Mathematics at 100 level only and does not lead to admission to Mathematics at 200 level.

Vector algebra, lines and planes, matrix algebra, solution of systems of equations, determinants. Complex numbers and polynomial equations. All topics are studied in the context of applications.

Calculus 148 (WTW 148)

Qualification	Undergraduate
Module credits	8.00
Programmes	BCom BCom Economics BCom Statistics BEd Senior Phase and Further Education and Training Teaching BSc Computer Science BSc Geoinformatics BSc Information and Knowledge Systems
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Economic and Management Sciences
Prerequisites	WTW 114 GS or WTW 134 GS
Contact time	1 tutorial per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Mathematics and Applied Mathematics
Period of presentation	Semester 2

Module content

*Students will not be credited for more than one of the following modules for their degree:

WTW 124, WTW 148 and WTW 164. The module WTW 148 is designed for students who require Mathematics at 100 level only and does not lead to admission to Mathematics at 200 level.

Integration techniques. Modelling with differential equations. Functions of several variables, partial derivatives, optimisation. Numerical techniques. All topics are studied in the context of applications.

Mathematical modelling 152 (WTW 152)

Qualification	Undergraduate
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Module credits	8.00
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Programmes	BSc Actuarial and Financial Mathematics BSc Applied Mathematics BSc Computer Science BSc Extended programme - Mathematical Sciences BSc Extended programme - Physical Sciences BSc Information and Knowledge Systems BSc Mathematical Statistics BSc Mathematics BSc Meteorology BSc Physics
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Service modules	Faculty of Engineering, Built Environment and Information Technology
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Prerequisites	50% for Mathematics in Grade 12
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Contact time	1 practical per week, 2 lectures per week
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Language of tuition	Module is presented in English
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Department	Mathematics and Applied Mathematics
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Period of presentation	Semester 1
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Module content

The module serves as an introduction to computer programming as used in science. Modelling of dynamical processes using difference equations; curve fitting and linear programming are studied. Applications are drawn from real-life situations in, among others, finance, economics and ecology.

Calculus 153 (WTW 153)

Qualification	Undergraduate
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Module credits	8.00
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Programmes	BEd Senior Phase and Further Education and Training Teaching BSc Extended programme - Mathematical Sciences BSc Extended programme - Physical Sciences
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Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Economic and Management Sciences
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Prerequisites	WTW 143
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Contact time	1 tutorial per week, 3 lectures per week, Foundation Course
Language of tuition	Module is presented in English
Department	Mathematics and Applied Mathematics
Period of presentation	Semester 1

Module content

Differential calculus of a single variable with proofs and applications. The mean value theorem, the rule of L'Hospital. Upper and lower sums, definite and indefinite integrals, the Fundamental theorem of Calculus, the mean value theorem for integrals, integration techniques, with some proofs.

Calculus 158 (WTW 158)

Qualification	Undergraduate
Module credits	16.00

Programmes	BEng Chemical Engineering BEng Chemical Engineering ENGAGE BEng Civil Engineering BEng Civil Engineering ENGAGE BEng Computer Engineering BEng Computer Engineering ENGAGE BEng Electrical Engineering BEng Electrical Engineering ENGAGE BEng Electronic Engineering BEng Electronic Engineering ENGAGE BEng Industrial Engineering BEng Industrial Engineering ENGAGE BEng Mechanical Engineering BEng Mechanical Engineering ENGAGE BEng Metallurgical Engineering BEng Metallurgical Engineering ENGAGE BEng Mining Engineering BEng Mining Engineering ENGAGE BSc Engineering and Environmental Geology BSc Geology
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Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	60% for Mathematics in Grade 12
Contact time	1 tutorial per week, 4 lectures per week
Language of tuition	Module is presented in English
Department	Mathematics and Applied Mathematics
Period of presentation	Semester 1

Module content

*This module is designed for first-year engineering students. Students will not be credited for more than one of the following modules for their degree: WTW 158, WTW 114, WTW 134, WTW 165.

Introduction to vector algebra. Functions, limits and continuity. Differential calculus of single variable functions, rate of change, graph sketching, applications. The mean value theorem, the rule of L'Hospital. Indefinite integrals, integration.

Dynamical processes 162 (WTW 162)

Qualification	Undergraduate
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Module credits	8.00
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Programmes	BSc Applied Mathematics BSc Chemistry BSc Computer Science BSc Extended programme - Mathematical Sciences BSc Extended programme - Physical Sciences BSc Mathematical Statistics BSc Mathematics BSc Meteorology BSc Physics
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Service modules	Faculty of Engineering, Built Environment and Information Technology
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Prerequisites	WTW 114
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Contact time	1 tutorial per week, 2 lectures per week
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Language of tuition	Module is presented in English
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Department	Mathematics and Applied Mathematics
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Period of presentation	Semester 2
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Module content

*Students will not be credited for more than one of the following modules for their degree: WTW 162 and WTW 264.

Introduction to the modelling of dynamical processes using elementary differential equations. Solution methods for first order differential equations and analysis of properties of solutions (graphs). Applications to real life situations.

Mathematics 164 (WTW 164)

Qualification	Undergraduate
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Module credits	16.00
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Programmes

BEng Chemical Engineering
BEng Chemical Engineering ENGAGE
BEng Civil Engineering
BEng Civil Engineering ENGAGE
BEng Computer Engineering
BEng Computer Engineering ENGAGE
BEng Electrical Engineering
BEng Electrical Engineering ENGAGE
BEng Electronic Engineering
BEng Electronic Engineering ENGAGE
BEng Industrial Engineering
BEng Industrial Engineering ENGAGE
BEng Mechanical Engineering
BEng Mechanical Engineering ENGAGE
BEng Metallurgical Engineering
BEng Metallurgical Engineering ENGAGE
BEng Mining Engineering
BEng Mining Engineering ENGAGE
BSc Engineering and Environmental Geology
BSc Extended programme - Physical Sciences
BSc Geology
BSc Meteorology

Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	WTW 114 or WTW 158
Contact time	1 tutorial per week, 4 lectures per week
Language of tuition	Module is presented in English
Department	Mathematics and Applied Mathematics
Period of presentation	Semester 2

Module content

*This module is designed for first-year engineering students. Students will not be credited for more than one of the following modules for their degree: WTW 146, WTW 148 and WTW 124,

Vector algebra with applications to lines and planes in space, matrix algebra, systems of linear equations, determinants, complex numbers, factorisation of polynomials and conic sections. Integration techniques, improper integrals. The definite integral, fundamental theorem of Calculus. Applications of integration. Elementary power series and Taylor's theorem. Vector functions, space curves and arc lengths. Quadratic surfaces and multivariable functions.

Mathematics 165 (WTW 165)

Qualification Undergraduate

Module credits 16.00

Programmes	BSc Biochemistry BSc Biological Sciences BSc Biotechnology BSc Genetics BSc Human Genetics BSc Human Physiology BSc Medical Sciences BSc Microbiology BVSc
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Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Economic and Management Sciences Faculty of Veterinary Science
Prerequisites	50% for Mathematics in Grade 12 and MGW 112# or registered for BVSc
Contact time	1 tutorial per week, 4 lectures per week
Language of tuition	Module is presented in English
Department	Mathematics and Applied Mathematics
Period of presentation	Semester 2

Module content

*Students will not be credited for more than one of the following modules for their degree: WTW 134, WTW 165, WTW 114, WTW 158. WTW 165 does not lead to Mathematics at 200 level and is intended for students who require Mathematics at 100 level only. WTW 165 is offered in English in the second semester only to students who have applied in the first semester of the current year for the approximately 65 MBChB, or the 5-6 BChD places becoming available in the second semester and who were therefore enrolled for MGW 112 in the first semester of the current year.

Functions, derivatives, interpretation of the derivative, rules of differentiation, applications of differentiation, integration, interpretation of the definite integral, applications of integration, matrices, solutions of systems of equations. All topics are studied in the context of applications.

Linear algebra 211 (WTW 211)

Qualification	Undergraduate
Module credits	12.00

Programmes	BCom
	BCom Econometrics
	BCom Statistics
	BCom Statistics and Data Science
	BEd Senior Phase and Further Education and Training Teaching
	BSc Actuarial and Financial Mathematics
	BSc Applied Mathematics
	BSc Chemistry
	BSc Engineering and Environmental Geology
	BSc Geology
	BSc Mathematical Statistics
	BSc Mathematics
	BSc Meteorology
	BSc Physics

Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Economic and Management Sciences
Prerequisites	WTW 124
Contact time	1 tutorial per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Mathematics and Applied Mathematics
Period of presentation	Semester 1

Module content

This is an introduction to linear algebra on R^n . Matrices and linear equations, linear combinations and spans, linear independence, subspaces, basis and dimension, eigenvalues, eigenvectors, similarity and diagonalisation of matrices, linear transformations.

Calculus 218 (WTW 218)

Qualification	Undergraduate
Module credits	12.00

Programmes	BCom
	BCom Econometrics
	BCom Statistics
	BCom Statistics and Data Science
	BEd Senior Phase and Further Education and Training Teaching
	BSc Actuarial and Financial Mathematics
	BSc Applied Mathematics
	BSc Chemistry
	BSc Engineering and Environmental Geology
	BSc Geology
	BSc Mathematical Statistics
	BSc Mathematics
	BSc Physics

Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Economic and Management Sciences
Prerequisites	WTW 114 and WTW 124
Contact time	1 tutorial per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Mathematics and Applied Mathematics
Period of presentation	Semester 1

Module content

Calculus of multivariable functions, directional derivatives. Extrema and Lagrange multipliers. Multiple integrals, polar, cylindrical and spherical coordinates.

Analysis 220 (WTW 220)

Qualification	Undergraduate
Module credits	12.00

Programmes

[BCom](#)
[BCom Statistics](#)
[BCom Statistics and Data Science](#)
[BSc Actuarial and Financial Mathematics](#)
[BSc Applied Mathematics](#)
[BSc Chemistry](#)
[BSc Engineering and Environmental Geology](#)
[BSc Geology](#)
[BSc Mathematical Statistics](#)
[BSc Mathematics](#)
[BSc Physics](#)

Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Economic and Management Sciences
Prerequisites	WTW 114 and WTW 124, WTW 211 and WTW 218
Contact time	1 tutorial per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Mathematics and Applied Mathematics
Period of presentation	Semester 2

Module content

*This module is recommended as an elective only for students who intend to enrol for WTW 310 and/or WTW 320. Students will not be credited for more than one of the following modules for their degree: WTW 220 and WTW 224.

Properties of real numbers. Analysis of sequences and series of real numbers. Power series and theorems of convergence. The Bolzano-Weierstrass theorem. The intermediate value theorem and analysis of real-valued functions on an interval. The Riemann integral: Existence and properties of the interval.

Linear algebra 221 (WTW 221)

Qualification	Undergraduate
Module credits	12.00
Programmes	BCom BCom Statistics BCom Statistics and Data Science BSc Actuarial and Financial Mathematics BSc Applied Mathematics BSc Chemistry BSc Engineering and Environmental Geology BSc Geology BSc Mathematical Statistics BSc Mathematics BSc Meteorology BSc Physics
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Economic and Management Sciences
Prerequisites	WTW 211 and WTW 218
Contact time	1 tutorial per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Mathematics and Applied Mathematics
Period of presentation	Semester 2

Module content

Abstract vector spaces, change of basis, matrix representation of linear transformations, orthogonality, diagonalisability of symmetric matrices, some applications.

Mathematics 238 (WTW 238)

Qualification	Undergraduate
Module credits	16.00

Programmes	BEng Chemical Engineering
	BEng Chemical Engineering ENGAGE
	BEng Civil Engineering
	BEng Civil Engineering ENGAGE
	BEng Computer Engineering
	BEng Computer Engineering ENGAGE
	BEng Electrical Engineering
	BEng Electrical Engineering ENGAGE
	BEng Electronic Engineering
	BEng Electronic Engineering ENGAGE
	BEng Industrial Engineering
	BEng Industrial Engineering ENGAGE
	BEng Mechanical Engineering
	BEng Mechanical Engineering ENGAGE
	BEng Metallurgical Engineering
	BEng Metallurgical Engineering ENGAGE
	BEng Mining Engineering
	BEng Mining Engineering ENGAGE

Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	WTW 256 and WTW 258 GS
Contact time	1 tutorial per week, 4 lectures per week
Language of tuition	Module is presented in English
Department	Mathematics and Applied Mathematics
Period of presentation	Semester 2

Module content

Linear algebra, eigenvalues and eigenvectors with applications to first and second order systems of differential equations. Sequences and series, convergence tests. Power series with applications to ordinary differential equations with variable coefficients. Fourier series with applications to partial differential equations such as potential, heat and wave equations.

Vector analysis 248 (WTW 248)

Qualification	Undergraduate
Module credits	12.00
Programmes	BCom Statistics and Data Science
	BEd Senior Phase and Further Education and Training Teaching
	BSc Applied Mathematics
	BSc Chemistry
	BSc Engineering and Environmental Geology
	BSc Geology
	BSc Mathematical Statistics
	BSc Mathematics
Service modules	BSc Physics
	Faculty of Engineering, Built Environment and Information Technology Faculty of Education

Prerequisites	WTW 218
Contact time	1 tutorial per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Mathematics and Applied Mathematics
Period of presentation	Semester 2

Module content

Vectors and geometry. Calculus of vector functions with applications to differential geometry, kinematics and dynamics. Vector analysis, including vector fields, line integrals of scalar and vector fields, conservative vector fields, surfaces and surface integrals, the Theorems of Green, Gauss and Stokes with applications.

Differential equations 256 (WTW 256)

Qualification	Undergraduate
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Module credits	8.00
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Programmes

[BEng Chemical Engineering](#)
[BEng Chemical Engineering ENGAGE](#)
[BEng Civil Engineering](#)
[BEng Civil Engineering ENGAGE](#)
[BEng Computer Engineering](#)
[BEng Computer Engineering ENGAGE](#)
[BEng Electrical Engineering](#)
[BEng Electrical Engineering ENGAGE](#)
[BEng Electronic Engineering](#)
[BEng Electronic Engineering ENGAGE](#)
[BEng Industrial Engineering](#)
[BEng Industrial Engineering ENGAGE](#)
[BEng Mechanical Engineering](#)
[BEng Mechanical Engineering ENGAGE](#)
[BEng Metallurgical Engineering](#)
[BEng Metallurgical Engineering ENGAGE](#)
[BEng Mining Engineering](#)
[BEng Mining Engineering ENGAGE](#)
[BSc Mathematics](#)
[BSc Meteorology](#)
[BSc Physics](#)

Service modules	Faculty of Engineering, Built Environment and Information Technology
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Prerequisites	WTW 158 and WTW 164
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Contact time	1 tutorial per week, 2 lectures per week
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Language of tuition	Module is presented in English
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Department	Mathematics and Applied Mathematics
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Period of presentation	Semester 1
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Module content

Theory and solution methods for linear differential equations as well as for systems of linear differential equations. Theory and solution methods for first order non-linear differential equations. The Laplace transform with application to differential equations. Application of differential equations to modelling problems.

Calculus 258 (WTW 258)

Qualification Undergraduate

Module credits 8.00

Programmes

BEng Chemical Engineering
BEng Chemical Engineering ENGAGE
BEng Civil Engineering
BEng Civil Engineering ENGAGE
BEng Computer Engineering
BEng Computer Engineering ENGAGE
BEng Electrical Engineering
BEng Electrical Engineering ENGAGE
BEng Electronic Engineering
BEng Electronic Engineering ENGAGE
BEng Industrial Engineering
BEng Industrial Engineering ENGAGE
BEng Mechanical Engineering
BEng Mechanical Engineering ENGAGE
BEng Metallurgical Engineering
BEng Metallurgical Engineering ENGAGE
BEng Mining Engineering
BEng Mining Engineering ENGAGE
BSc Mathematics
BSc Meteorology

Service modules Faculty of Engineering, Built Environment and Information Technology

Prerequisites WTW 158 and WTW 164

Contact time 1 tutorial per week, 2 lectures per week

Language of tuition Module is presented in English

Department Mathematics and Applied Mathematics

Period of presentation Semester 1

Module content

Calculus of multivariable functions, directional derivatives. Extrema. Multiple integrals, polar, cylindrical and spherical coordinates. Line integrals and the theorem of Green. Surface integrals and the theorems of Gauss and Stokes.

Numerical methods 263 (WTW 263)

Qualification Undergraduate

Module credits 8.00

Programmes

BEng Chemical Engineering
BEng Chemical Engineering ENGAGE
BEng Civil Engineering
BEng Civil Engineering ENGAGE
BEng Computer Engineering
BEng Computer Engineering ENGAGE
BEng Electrical Engineering
BEng Electrical Engineering ENGAGE
BEng Electronic Engineering
BEng Electronic Engineering ENGAGE
BEng Industrial Engineering
BEng Industrial Engineering ENGAGE
BEng Mechanical Engineering
BEng Mechanical Engineering ENGAGE
BEng Metallurgical Engineering
BEng Metallurgical Engineering ENGAGE
BEng Mining Engineering
BEng Mining Engineering ENGAGE
BSc Mathematics
BSc Meteorology

Service modules	Faculty of Engineering, Built Environment and Information Technology
Prerequisites	WTW 164
Contact time	1 tutorial per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Mathematics and Applied Mathematics
Period of presentation	Semester 2

Module content

Numerical integration. Numerical methods to approximate the solution of non-linear equations, systems of equations (linear and non-linear), differential equations and systems of differential equations. Direct methods to solve linear systems of equations.

Differential equations 264 (WTW 264)

Qualification	Undergraduate
Module credits	12.00

Programmes

BCom
BCom Statistics and Data Science
BSc Actuarial and Financial Mathematics
BSc Engineering and Environmental Geology
BSc Geology
BSc Mathematical Statistics
BSc Meteorology

Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Economic and Management Sciences
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Prerequisites	WTW 114 and WTW 124
Contact time	1 tutorial per week, 2 lectures per week
Language of tuition	Module is presented in English
Department	Mathematics and Applied Mathematics
Period of presentation	Semester 2

Module content

*Students will not be credited for both WTW 162 and WTW 264 or both WTW 264 and WTW 286 for their degree.

Theory and solution methods for ordinary differential equations and initial value problems: separable and linear first order equations, linear equations of higher order, systems of linear equations. Laplace transform.

Discrete structures 285 (WTW 285)

Qualification Undergraduate

Module credits 12.00

Programmes

- BSc Applied Mathematics
- BSc Chemistry
- BSc Computer Science
- BSc Information and Knowledge Systems
- BSc Mathematical Statistics
- BSc Mathematics
- BSc Meteorology
- BSc Physics

Service modules Faculty of Engineering, Built Environment and Information Technology

Prerequisites WTW 115

Contact time 1 tutorial per week, 2 lectures per week

Language of tuition Module is presented in English

Department Mathematics and Applied Mathematics

Period of presentation Semester 2

Module content

Setting up and solving recurrence relations. Equivalence and partial order relations. Graphs: paths, cycles, trees, isomorphism. Graph algorithms: Kruskal, Prim, Fleury. Finite state automata.

Differential equations 286 (WTW 286)

Qualification Undergraduate

Module credits 12.00

Programmes	BCom BSc Applied Mathematics BSc Chemistry BSc Mathematical Statistics BSc Mathematics BSc Meteorology BSc Physics
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Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Economic and Management Sciences
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Prerequisites	WTW 114, WTW 124 and WTW 162
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Contact time	1 tutorial per week, 2 lectures per week
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Language of tuition	Module is presented in English
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Department	Mathematics and Applied Mathematics
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Period of presentation	Semester 1
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Module content

*Students will not be credited for more than one of the modules for their degree: WTW 264, WTW 286
Theory and solution methods for ordinary differential equations and initial value problems: separable and linear first-order equations, linear equations of higher order, systems of linear equations. Application to mathematical models. Numerical methods applied to nonlinear systems. Qualitative analysis of linear systems.

Financial engineering 354 (WTW 354)

Qualification	Undergraduate
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Module credits	18.00
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Programmes	BCom BCom Statistics BCom Statistics and Data Science BSc Actuarial and Financial Mathematics BSc Applied Mathematics BSc Computer Science BSc Mathematical Statistics BSc Mathematics
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Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Economic and Management Sciences
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Prerequisites	WST 211, WTW 211 and WTW 218
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Contact time	1 tutorial per week, 2 lectures per week
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Language of tuition	Afrikaans and English are used in one class
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Department	Mathematics and Applied Mathematics
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Period of presentation	Semester 1
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Module content

Mean variance portfolio theory. Market equilibrium models such as the capital asset pricing model. Factor models and arbitrage pricing theory. Measures of investment risk. Efficient market hypothesis. Stochastic models of security prices

Algebra 381 (WTW 381)

Qualification	Undergraduate
Module credits	18.00
Programmes	BCom BCom Statistics and Data Science BSc Applied Mathematics BSc Computer Science BSc Geology BSc Mathematical Statistics BSc Mathematics BSc Physics
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Economic and Management Sciences Faculty of Humanities
Prerequisites	WTW 114 and WTW 211
Contact time	1 tutorial per week, 2 lectures per week
Language of tuition	Afrikaans and English are used in one class
Department	Mathematics and Applied Mathematics
Period of presentation	Semester 1

Module content

Group theory: Definition, examples, elementary properties, subgroups, permutation groups, isomorphism, order, cyclic groups, homomorphisms, factor groups. Ring theory: Definition, examples, elementary properties, ideals, homomorphisms, factor rings, polynomial rings, factorisation of polynomials. Field extensions, applications to straight-edge and compass constructions.

Dynamical systems 382 (WTW 382)

Qualification	Undergraduate
Module credits	18.00

Programmes	BCom BCom Statistics BCom Statistics and Data Science BSc Actuarial and Financial Mathematics BSc Applied Mathematics BSc Geology BSc Mathematical Statistics BSc Mathematics BSc Physics
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Economic and Management Sciences
Prerequisites	WTW 218 and WTW 286/264
Contact time	1 tutorial per week, 2 lectures per week
Language of tuition	Afrikaans and English are used in one class
Department	Mathematics and Applied Mathematics
Period of presentation	Semester 1

Module content

Matrix exponential function: homogeneous and non-homogeneous linear systems of differential equations.
Qualitative analysis of systems: phase portraits, stability, linearisation, energy method and Liapunov's method.
Introduction to chaotic systems. Application to real life problems.

Numerical analysis 383 (WTW 383)

Qualification	Undergraduate
Module credits	18.00
Programmes	BCom BCom Statistics BCom Statistics and Data Science BSc Actuarial and Financial Mathematics BSc Applied Mathematics BSc Chemistry BSc Computer Science BSc Geology BSc Mathematical Statistics BSc Mathematics BSc Meteorology BSc Physics
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Economic and Management Sciences Faculty of Humanities
Prerequisites	WTW 114, WTW 123 WTW 124 and WTW 211
Contact time	1 practical per week, 2 lectures per week

Language of tuition	Afrikaans and English are used in one class
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Department	Mathematics and Applied Mathematics
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Period of presentation	Semester 2
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Module content

Direct methods for the numerical solution of systems of linear equations, pivoting strategies. Iterative methods for solving systems of linear equations and eigenvalue problems. Iterative methods for solving systems of nonlinear equations. Introduction to optimization. Algorithms for the considered numerical methods are derived and implemented in computer programmes. Complexity of computation is investigated. Error estimates and convergence results are proved.

Partial differential equations 386 (WTW 386)

Qualification	Undergraduate
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Module credits	18.00
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Programmes	BSc Actuarial and Financial Mathematics BSc Applied Mathematics BSc Geology BSc Mathematical Statistics BSc Mathematics BSc Meteorology BSc Physics
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Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education
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Prerequisites	WTW 248 and WTW 286/264
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Contact time	1 tutorial per week, 2 lectures per week
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Language of tuition	Afrikaans and English are used in one class
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Department	Mathematics and Applied Mathematics
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Period of presentation	Semester 1
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Module content

Conservation laws and modelling. Fourier analysis. Heat equation, wave equation and Laplace's equation. Solution methods including Fourier series. Energy and other qualitative methods.

Geometry 389 (WTW 389)

Qualification	Undergraduate
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Module credits	18.00
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Programmes	BCom Statistics and Data Science
	BEd Senior Phase and Further Education and Training Teaching
	BSc Applied Mathematics
	BSc Chemistry
	BSc Computer Science
	BSc Geology
	BSc Mathematical Statistics
	BSc Mathematics
	BSc Physics
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education Faculty of Humanities
Prerequisites	WTW 211
Contact time	1 tutorial per week, 2 lectures per week
Language of tuition	Afrikaans and English are used in one class
Department	Mathematics and Applied Mathematics
Period of presentation	Semester 2

Module content

Axiomatic development of neutral, Euclidean and hyperbolic geometry. Using models of geometries to show that the parallel postulate is independent of the other postulates of Euclid.

Big data science elective 801 (WTW 801)

Qualification	Postgraduate
Module credits	5.00
Programmes	MIT Big Data Science (Coursework)
Contact time	5 contact hours
Language of tuition	Module is presented in English
Department	Mathematics and Applied Mathematics
Period of presentation	Semester 2

Module content

Five 5 credits of an elective course can be drawn from Mathematics and Applied Mathematics. In addition to study-leader approval, elective course selection may be subject to course pre-requisites, course availability, and internal departmental regulations as decided by the Head of the Department.

Big data science elective 802 (WTW 802)

Qualification	Postgraduate
Module credits	5.00
Programmes	MIT Big Data Science (Coursework)
Contact time	5 contact hours

Language of tuition	Module is presented in English
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Department	Mathematics and Applied Mathematics
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Period of presentation	Semester 2
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Module content

Five 5 credits of an elective course can be drawn from Mathematics and Applied Mathematics. In addition to study-leader approval, elective course selection may be subject to course pre-requisites, course availability, and internal departmental regulations as decided by the Head of the Department.

Workshop practice 121 (WWP 121)

Qualification	Undergraduate
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Module credits	6.00
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Programmes	BEng Chemical Engineering BEng Chemical Engineering ENGAGE BEng Industrial Engineering BEng Industrial Engineering ENGAGE BEng Mechanical Engineering BEng Mechanical Engineering ENGAGE BEng Metallurgical Engineering BEng Metallurgical Engineering ENGAGE
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Prerequisites	No prerequisites.
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Contact time	1 other contact session per week
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Language of tuition	Module is presented in English
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Department	Mechanical and Aeronautical Engineering
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Period of presentation	Semester 2
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Module content

*Attendance module only

The module is offered at the end of the first year of study and lasts at least eight days, during which training is given in the following workshops: electronic projects, panel wiring, electrical motors and switch gear, general machines, welding, turning and sheet metal work. Each student's progress is assessed after each workshop.

Introduction to isiZulu grammar - Capita selecta 111 (ZUL 111)

Qualification	Undergraduate
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Module credits	12.00
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Programmes	BA BA Extended programme BA Languages BA Law BEd Foundation Phase Teaching BEd Intermediate Phase Teaching BEd Senior Phase and Further Education and Training Teaching BIS Publishing
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Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education
Prerequisites	No prerequisites.
Contact time	2 lectures per week
Language of tuition	Module is presented in isiZulu
Department	African Languages
Period of presentation	Semester 1

Module content

*For speakers of isiZulu as home language or first or second additional language.

Aspects of the grammar of isiZulu such as an introduction to the word categories; an introduction to the structure, meaning and use of the noun, the adjective, the relative, the possessive; the verb; writing and spelling rules; dictionaries and dictionary use; grammatical analysis.

isiZulu grammar - Capita selecta 211 (ZUL 211)

Qualification	Undergraduate
Module credits	20.00

Programmes

BA
BA Languages
BA Law
BEd Foundation Phase Teaching
BEd Intermediate Phase Teaching
BEd Senior Phase and Further Education and Training Teaching
BIS Publishing
BPolSci Political Studies

Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education
Prerequisites	ZUL 111, AFT 121
Contact time	2 lectures per week
Language of tuition	Module is presented in isiZulu
Department	African Languages
Period of presentation	Semester 1

Module content

Aspects of the grammar of isiZulu such as a continuation of the study of the word categories; grammatical analysis; the structure, meaning and use of the pronoun and the enumerative; an introduction to isiZulu speech sounds/phonetics.

isiZulu 310 (ZUL 310)

Qualification	Undergraduate
Module credits	30.00

Programmes	BA
	BA Languages
	BA Law
	BEd Senior Phase and Further Education and Training Teaching
	BIS Publishing
	BPolSci Political Studies
Service modules	Faculty of Engineering, Built Environment and Information Technology Faculty of Education
Prerequisites	ZUL 210, ZUL 220 will be required for students who completed ZUL 110, ZUL 120 at year level 1 and ZUL 211, AFT 220 will be required for students who completed ZUL 111, AFT 121 at year level 1
Contact time	1 discussion class per week, 2 lectures per week
Language of tuition	Module is presented in English and isiZulu
Department	African Languages
Period of presentation	Semester 1

Module content

isiZulu grammar - Capita selecta
 Aspects of the grammar of isiZulu such as a continuation of the study of the word categories; grammatical analysis; more intensive study of the structure, meaning and use of the noun (specifically derived nouns) and verb (specifically moods and verbal extensions); an introduction to the sound changes/phonology of isiZulu. The acquisition and inculcation of advanced communicative skills within a larger number of social, occupational and educational situations. Awareness of the nature and function of language structures is heightened further. Attention is also paid to cultural phenomena.

The information published here is subject to change and may be amended after the publication of this information. The [General Regulations \(G Regulations\)](#) apply to all faculties of the University of Pretoria. It is expected of students to familiarise themselves well with these regulations as well as with the information contained in the [General Rules](#) section. Ignorance concerning these regulations and rules will not be accepted as an excuse for any transgression.